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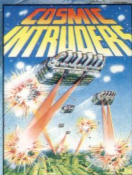
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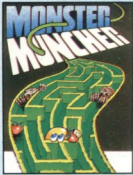
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## News & Reviews

### GAMES NEWS 16

The first game in four-D! Melbourne House goes one D better. And every TV games centre addicts' favourite title has been translated to computer. Play Demon Attack on the Vic and Atari. Four pages of the latest software for all machines.

### ARCADE ACTION 30

Tips on surviving beneath a pyramid on the trail of Tutankhamun's gold. Plus Roc n' Rope for other intrepid adventurers and pinball can now be played by couples. Take on a friend on the tilting loquat piratical.

### REVIEWS 104

The decline and fall of the Roman Empire on your Spectrum, arcade hit Q\*bert converted for the Atari, plus Spectrum owners end up down a Blind Alley.

### NEXT MONTH 5

News of our July offering including another fascinating competition for Bug fans and a games supplement for the keen collectors of our games listings.

## Listings

### QUICKDRAW 32

Howdy partners. This town ain't big enough for both of us — so you and your darn Apple computer better saddle up and git out. Either that or learn a quick draw pretty swift. You catch my drift stranger.

### SUBSTRIKE 40

They run silent and run deep these deadly denizens of the deeps. The good ship TI 99/4a is out to hunt them down.

### BAT AND BALL 44

Howzat! Get in shape for the cricket season with this reincarnation of one of the very first video games. For the BBC models A or B.

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### CANNON MASTER 64

Perched like a vulture high atop a heavily armed battle tower you await the enemy attack. Cosmic action for the ZX81.

### THE BLACK BOX 70

Dare you open the Black Box and discover its inner secrets? We dare you! Unlock the mysteries of the box with your Spectrum.

### TRENCH 78

The deadly Death Star is back — and twice as mean. Can you destroy it before it wipes out your corner of the Dragon universe?



### PROTECTOR 48

Beware the space pirates skipper. They'll do you a mischief and that's for sure. Unless you can spike their guns afore they gets you and your mate Vic.

### SNAKES 53

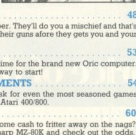
More slippery customers, this time for the brand new Oric computer. A first for C&VG. And what a way to start!

### THE TEN COMMANDMENTS 54

Holy Moses! This is a tough task for even the most seasoned games player. A biblical epic for the Atari 800.

### ROYAL ASCOT 60

Fancy a day at the races with some cash to fritter away on the nags? Well roll up to your jolly old Sharp MZ-80K and check out the odds.



## Swords and surgery

Do adventurers get you down? Does the troll on the bridge, refusing all treasures make you tense?

Can trying to find a way out of the coloured mirror maze, make you look at yourself in a new light? Here at *Computer & Video Games* we've seen too many fine adventurers go to the wall — and end up banging their heads on it.

We know the pain and suffering a tough adventure can cause and we've opened up a helpline to Keith Campbell. Keith knows his way out of more adventures than most trolls have had hot dinners. Those he can't help with, he will throw open to the C&VG readership, to find an answer. All on page 83.

## Features

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More of your questions answered.

### COMPETITION 10

Write a program for Dixons and you could win an Atari 800.

### BUGS 25

Will the Bugs be converted to a user friendly frame of mind?

### GO 27

Find out why this game is more popular than The Times crossword — in Japan.

### DRAGON GAMES 28

Ron Potkin tells you how to get more software for your Dragon... courtesy of the Tandy Colour Computer.

### SOFTWARE FORM 68

All you need to know about getting your game printed in your favourite magazine.

### ADVENTURE 83

Reached an impasse on your latest adventure? Now help is at hand.

### CHESS 84

Max Brammer and the Duchesse!

### WARPATH 86

It's Ron Potkin again — this time hoping the cavalry arrives in time!

### GRAPHICS 93

Garry Marshall brings eyesight to "blind" micros.

### MACHINE CODE 98

Ted Ball's half term test. Have you been paying attention? Find out here!

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## NOW LET OFF SOME STEAM

We've had a few unfortunate experiences with software but luckily in our privileged position we can vent off some steam through the C&VG Reviews pages.

Up until now, you have not had the same opportunity to warn people about your own software disasters.

Now, things are different. C&VG is going to give over a page or two each month to Great Software Disasters, which will be written by you, the readers.

If you have bought a piece of software — or a peripheral, or even a computer — which you feel does not live up to its marketing blurb please write in and tell us.

Reviews of bad software are just as important as reviews of good. And we strongly feel that the software houses which really do believe in quality rather than putting out any title which may make a killing in the short-term, should be supported. The only restriction we will put on this column is that the manufacturers will be allowed a right of reply before we publish.

The first offering is a delightful rundown of one man's experiences with an Oric Computer. Keith Ollett is the man behind Aeiric Bloodaxe or How I Learnt to Live With an Oric. Not only does it tackle one man's struggle to adapt to a new micro but it does so in a way that had most C&VG staff stifling giggles and we also get the feeling that before too long Mr Ollett is going to form an undying affection for the new companion in his life.

Read about Aeiric Bloodaxe next month and if it reminds you of some of your own experiences in the microcomputer market then write and let us know. It doesn't have to be as long as Mr Ollett's piece, just long enough to get your views across.

**NEXT MONTH**

centre readers.

There is a whole host of new games cartridges plus a range of new machines, like the Vectrex and the Colecovision. All of which gives us more to tell you about each month.

C&VG already leads the rest in its information on the video games scene, so for the latest news and the most trustworthy reviews test out our expanded Video Screens section next month. After all, the next generation of microcomputers may well burst out of this market.

**NEXT MONTH**

Vibra seats, holophones and laser discs may still be a little bit beyond what Britain's arcades are currently capable of. But they are still ready to pull out a few surprises.

Like Tip Top, a 3D version of Donkey Kong which sets an explorer down in the jungle, dodging 3D coconuts as he tries to get his own back on a mischievous ape.

There's also a rundown of Buck Rogers, the futuristic space ace who has found his way into a video games cabinet and the right way to approach the World War II game Frontline.

Plus arcade tips on new favourite Donkey Kong Junior.

**NEXT MONTH**

There's games in them that pages of the July C&VG.

Games enough for everyone as we are packing in an extra listings-only section. 32 pages packed with versions of popular games for all kinds of microcomputer — on top of our normal selection of games programs.

Spectrum owners are in for a bouncing climbing treat with both Donkey Kong and Donkey Kong Junior putting in an appearance on their machine. Donkey Kong features the second screen of the arcade game with fires and ladders and Mario knocking the plugs out of the construction below Kong's feet.

DK Junior features the vines, snap-jaws and fruits of this increasingly popular arcade game.

Defend, Bug Battle, Spike Attack, Meteor, Draughts, Labyrinth and old favourites, like: Munchmen and Ninek's Invaders will be among the titles to take your mind off the forthcoming summer holidays.

## COMPUTER GAMES TOP TEN

### Sinclair Spectrum

- 1 The Hobbit (Melbourne House)
- 2 Arcadia (Imagine)
- 3 Penetrator (Melbourne House)
- 4 Horace Goes Skiing (Psion)
- 5 Time Gate (Quicksilver)
- 6 Flight Simulation (Psion)
- 7 3D Tunnel (New Generation)
- 8 Blind Alley (Sunshine)
- 9 Spectral Invaders (Bug Byte)
- 10 Planetoids (Psion)

### Vic 20

- 1 Jelly Monsters (Commodore)
- 2 Choplifter (Creative Software)
- 3 Star Battle
- 4 Blitz
- 5 Sargon II Chess
- 6 Skramble (Rabbit)
- 7 Gorf
- 8 Cosmiades (Bug-Byte)
- 9 Vic Panic (Bug-Byte)
- 10 Hoplit

### Atari 400/800

- 1 Defender (Atari)
- 2 Pacman (Atari)
- 3 Galaxians (Atari)
- 4 Star Raiders (Atari)
- 5 Zaxxon (Calisto)
- 6 Centipede (Atari)
- 7 Miner 2049'er (Tigervision)
- 8 Missile Command (Atari)
- 9 Choplifter (Creative software)
- 10 Qix (Atari)

### ZX-81

- 1 Flight Simulation (Psion)
- 2 3D Defender
- 3 Mazogs (Bug-Byte)
- 4 OS Galaxians/Gloops (Quicksilver)
- 5 Space Raiders (Psion)
- 6 Thro the Wall/Scramble (Psion)
- 7 3D Monster Maze (J. K. Greye)
- 8 Gulpman II (Campbell)
- 9 Gobblerman (Artic)
- 10 Chess (Psion)

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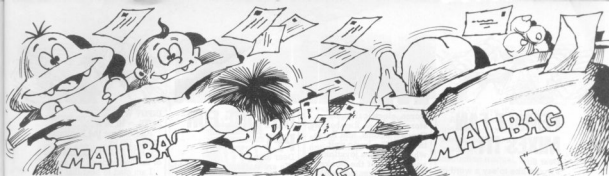
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## JUMBO AND SUBMARINE

Dear Sir,  
I would like to point out that our program Jumbo Jet Pilot, currently available for the Atari 400 and 800, is not being developed for, and shall not be available for, any other computer.

Submarine Commander is currently under development for the Commodore Vic-20 and is being considered for development for the Texas Instruments 99/4A. No release date has yet been set for either program.

Mike Dixon,  
UK Sales Manager,  
Home Computer Software,  
Thorn-EMI,  
London.

## RETURN OF KRAZY KONG!

Dear Sir,  
A friend of mine consulted me about a game program from your magazine for the Pet called Krazy Kong (February 1983 issue) as it would not work.

Apart from typing errors, the main cause was that it was written for a 9 inch screen Pet and used a PEEK to find the value of key pressed (PEEK 151). Unfortunately, 12inch screen 4000 series Pets give different values to the earlier small screen, a fact not widely known.

To convert the program to be universal (on all except the Basic 2 version machines) it is necessary to change the following lines in the program.

Line 20: Replace with lines 15 to 25  
Line 170 to 240: Change variable S to S1  
Lines 1050 to 1090: To use variables Z1, Z2, Z3 & Z4  
Lines 1220 and 1230: Change variable S to S1

With these amendments, the program will run on most Pets... an excellent game in my opinion. If anyone wants to check the value for any key pressed, the following program will show them.

```
1 A = PEEK (151) : PRINT A
2 GO TO 1
```

### Amendments

```
Line 15: K = 41: P = 40: H =
39: REM FOR CURSOR
Line 18: REM SINCH
SCREEN VARIABLES
Line 22: REM 12INCH
SCREEN VARIABLES
Line 25: IF PEEK (57344) =
76THENS = 82:Z156:Z2 = 50:
Z3 = 62:Z4 = 60:Z5 = 84
```

```
Line 1050:
IFA = Z1THENIFPEEK(J - P).....
Line 1060:
IFA = Z2ANDA1.....
Line 1080:
IFA = Z3THENGOSUB500
Line 1090:
IFA = Z4THENGOSUB600
John Bloor,
Kingswinford,
West Midlands.
```

## ROCKFALL DODGES!

Dear Sir,  
There are two reasons why readers may have difficulty in getting Rockfall printed in your March 1983 issue, to work. First, the printer used to obtain the listing appears to have a different character set to the one on the BBC.

This, of course, has the effect that certain BBC characters are replaced by certain non-BBC characters on the listing.

This effect occurs on the following lines:  
LINE 10, " + SHOULD BE " (" (WHICH IS DISPLAYED AS " - IN MODE 7)

LINE 10, " + SHOULD BE " (" (" IN MODE 7)  
LINE 60, " - SHOULD BE " (" (" IN MODE 7)

Secondly, the program does not work on an Operating System 1.2 machine due to the method

it uses to read the keyboard. Corrections should be made as follows:

```
530 Z% = Y% + X% : A% =
INKEY (-26) - INKEY
(-122)
600 M% = A% : C% = Z%
X% = X% + A% : IF X% C0
X% = 0
```

It would also be a good idea to replace "OPTO" on line 10 with "OPT2".

David Mc Keran,  
Sunderland,  
Tyne & Wear.

## WHERE CAN I TURN TO?

Dear Sir,  
I am keen to learn more about my Oric computer but do not know who to turn to as I am new to computing. Can you please advise me whether any groups or any other organisations for Oric users that I can turn to for help exist at the moment?  
Julian Douglas,  
Hartsholme,  
Lincoln.

Editor's reply: The Tangerine Users Group (TUG for short) is offering its services to Oric owners and the organisation can be contacted at: 1, Marlborough Drive, Worle, Avon BS22 0DQ.

But Bob Green of TUG tells me he is currently overwhelmed with response from Oric owners and delays of 14 days before the organisation can get back to enquirers, are inevitable.

## COLOURFUL SKYSCRAPER

Dear Sir,  
I have a few modifications to suggest that will introduce a dash of colour to the Skyscraper program printed in April's C&VG. For example, the following changes will give, a yellow plane, a red bomb, black

background and blue skyscrapers:  
30 FOR K = 0 TO  
RND(12): POKE J.  
K\*32,175:  
NEXT-NEXT-REM  
SKYSCRAPER COLOUR

40 PLS =  
CHRS(158)+CHRS(155)+  
CHRS(146):REM PLANE  
COLOUR

50 NPS =  
STRINGS(3,CHRS(128))  
:PO = 32:  
BOS =  
CHRS(177):RA=5:SC=0  
:REM BOMB COLOUR

80 IF PEEK (PO+1025) =  
175 THEN CLS:PRINT  
@ 150:  
"SPLAT" : PRINT "YOU  
CRASHED INTO A  
SKYSCRAPER":  
PRINT "YOUR SCORE  
WAS:":SC:  
GOSUB 2500: PRINT  
"DO YOU WANT  
ANOTHER GO?":  
INPUT US : IF  
LEFTS(US,1) = "Y" THEN  
5 ELSE END:  
REM DETECTS  
SKYSCRAPER COLOUR  
WHEN CRASH  
OCCURS

1000 IF SP + 32 479 then BD  
= 0:POKE SP +  
1024,128:  
RETURN ELSE IF PEEK  
(SP + 32 + 1024) = 175  
THEN  
POKE SP + 32 + 1024,  
128: ..... (Rest of  
line as printed): REM  
DETECTS WHEN  
BOMB HITS  
SKYSCRAPER

The colours can be changed to any of the eight colours available, simply by adding the appropriate CHRS codes, listed on page 138 of the user manual, to the values given in the, all green, original version printed in your magazine.  
E. U. Lovesay,  
Norwich,  
Norfolk.



# MAILBAG



## FEMALE FAN MIXES IT!

Dear Sir,  
I would like to say a word of appreciation for your magazine. We have had Texas TI99/4a for around four months.

Yours is the only magazine which regularly has listings and adverts for our super fantastic machine. The machine is great — wonderful keyboard, excellent display, clear sound, enormous ROM (Edit Mode is super!)

For other Texas TI 99/4a fanatics here is a colour mixing program discovered by Ian Ellis, aged 10, a friend of my son's:  
100 CALL CLEAR  
110 CALL SCREEN (16)  
120 INPUT "FIRST COLOUR" A  
130 INPUT "SECOND COLOUR" B  
140 CALL COLOUR (9,A,B)  
150 CALL CHAR  
(97,"SSAA55AA55AA55AA")  
160 CALL HCAR (1,1,97,768)  
170 GOTO 170

It gives an apparently unlimited number of shades and colours.

By the way — are there any other female computer fans out there?

Hazel Perkins,  
Adel,  
Leeds.

## PLUGGING A NEW MACHINE

Dear Sir,  
Please could you tell me the price of the new Colecovision you have mentioned in your magazine, and when it will be available. I have an Intellivision games machine and was wondering if I could put Intellivision games onto the Colecovision or vice-versa. I have also read in your magazine about a module which plugs into the Colecovision and allows it to take Atari games — will I be able to fit this module to my Intellivision?  
Paul Hanks,  
Stroud,  
Gloucestershire.  
Editor's reply: The Colecovision will be on sale at most major high street

stores, electrical chain stores, such as Rumbelows, Greens, Dixons, and Boots, in May. The basic unit, which includes joysticks and a copy of the Donkey Kong cartridge, will sell for £149.99. The Atari adaptor, which enables you to play VCS games on the Colecovision will be available at a slightly later date and will retail at £55. No Intellivision adaptors are available yet.

## HIGH SCORE FOR PENGU

Dear Sir,  
In the February issue you gave a good description of Pengo. Which was great because my local newsagent had just installed the game.

Now in the March issue some idiot called "Terry Pratt" has a high score of 17,410. Seeing this I thought that my high score is slightly better. It stands at 374,950. I had to clear 45 screens of snow-bees.

If there is any chance that my high score is the record could you send me a reply, so I could show my friends who have high scores on machines but they don't think its worth writing because they never get a reply.

Martin Stone,  
Chalfont St Peter,  
Buckinghamshire.

Editor's reply: This "idiot" realised his score wouldn't stand for long — but thought it might set a target for other Pengo freaks to aim at Martin.

Please tell your friends to use their top scores by entering our 1983 Video Games Championships. See page 10 of this issue.



## HOTLINE FOR PET

Dear Sir,  
We are starting a Pet Monthly newsletter service.

It will contain programming hints and tips plus information regarding copyright, submission to periodicals/publishers, etc., technical information for hardware circuitry plus program listings, plus a "hotline" telephone service. Annual subscription is £7 and should be sent to the address below.

Aquarius Software,  
10 Kenneth Road,  
Pitsea,  
Basildon,  
Essex.

## DOGFIGHTER CONVERSION

Dear Sir,  
I tried to enter the Vic-20 Dogfight program featured in your December '82 issue into my school's Vic. My school has the Vic 1211A Hi-Res super expander but no joysticks. Listed below are the conversions needed to run the program without joysticks.

The following lines should be changed:

```
40 GET SS
45 IF SS="r" THEN GOSUB
SS$
46 IF SS="THEN X=X:Y=Y
50 IF SS="S" THEN B=1
60 IF SS="A" THEN B=2
67 IF SS="W" THEN B=3
70 IF SS="X" THEN B=4
```

These conversions give the following controls:

Dive=W, Climb=X, Left=A, Right=S, Fire=Space bar.  
Kevin Hall,  
Hull,  
N. Humberside.

## SLOW DOWN DRAGON!

Dear Sir,  
I typed in the 'Dragon Run' listing in your April '83 issue, which worked perfectly. Try adding these few extra lines. They will slow the game down if you think it's too fast!  
31 ? CHR\$(125)  
32 ?? "ALSO, PLEASE ENTER SKILL LEVEL"  
33 ? "(1=hard, 9=easy)";

INPUT WW  
34 TE = 10\*WW

And change the beginning of line 130 to:  
130 FOR I=1 TO TE (the rest of the line remains the same).

I am glad to hear that the Atari range of computers have gone down in price again. The 400 may still not be the best value, but for the little extra money you get some of the best sounds and graphics of any home micro. A look at a few of the new game cartridges, like Defender, will prove me right.

I would like to send a message to all Atari owners — to get the most from their machine, they should join an owners club, and if there isn't a local one, be adventurous enough to start one.

Edward Tilsley,  
Eastcote,  
Middlesex

## THE PLANET OF DEATH

Dear Sir,  
I felt compelled to write after playing my first ever adventure. I need help!

What do I need the slimy gloves for? Why is the green man so unfriendly? What does the dance music mean? Why won't the computer — down the pit, behind the wind tunnel — talk to me?

These are just some of the many questions arising after having entered Artic's 48K Planet of Death for the ZX Spectrum. The story so far:

I found myself on a mountain plateau, with only a piece of sharp flint for company. I pick it up, and move into a damp limestone cave with a picture of a man climbing down a pit using a rope.

Moving on, I finally collect rope, a pair of boots, a broken floorboard, a laser gun and some stones.

Making my way to the bottom of the pit, I find the green man. I shake his hand, and he throts me. Oh no not again!

Sometime later I arrive once more at the side of the green man who sleeps on the mirror. This time I shoot him and he goes up in a puff of smoke leaving behind him a broken mirror. I pick the



## SCORES START TO MOUNT

The high arcade scores of would-be champions are beginning to mount in the Computer & Video Games office.

A whole host of machines are proving their popularity but few clear leaders have so far emerged. Many players have stayed with tried and true favourites which have been languishing in arcades for years while others proudly sign their name beside the latest games on the market.

Asteroids, Pacman and Scramble feature among the older games still finding favour with video gamers. James Thomas of Fishguard has taken an early lead with his signed Scramble score of 3,672,820 from the Cleddau Leisure Centre in Haverford West. But the rest of the Scramble scores are languishing well behind.

Jonathan Rees must be suffering from a bad case of Pacman finger

## BE A CHAMP

A brand spanking new arcade game, not previously released in the UK is still to be claimed from Taitel Electronics.

The prize will go to our 1983 Video Games Champion when he has seen off all opposition at the grand final on July 7th.

To qualify for that final, simply cut out the form below and take it down to your local pub or arcade or wherever your favourite machines can be found.

Put up the best score you can on the machine and when you reach a

score you're happy with, ask the arcade or pub manager to sign the form to witness it. You can repeat this process on any two other machines which you fancy your chances on, or purely send the form off to us at C&VG in an envelope marked: 1983 Video Games Championships, Computer & Video Games, Durrant House, 8 Herbal Hill, London EC1R 5JB.

If you mess up this form write or phone and we'll send you another one. You can enter as many times as you like before the June 23rd closing date — but don't leave it too late as the vagaries of the post may mean your scores arrive too late.

after achieving over two million at the Carousel Amusements in Southport. Another two million plus score was notched up by Andrew Freeman of Pitsea Pool in Basildon on Asteroids.

Donkey Kong and Robotron are among the games being battled over by other arcade veterans. Some \$69,000 from Mark Neale was witnessed in the Boscombe Pier

Amusements on Donkey Kong while current top Robotron ace is R. Cooper whose score of over nine million stirred the locals in the De-Luxe arcade in Hastings.

Among the recent games vying for position are: Amidar and the popular Mr Do plus my own favourite, Pengo... but I won't be featuring in the final after seeing the latest scores on that.

## Please enter the following scores in your 1983 Video Games Championships

My high score is:

It was scored on a:

..... machine

Date:

The manager of the pub/arcade who witnessed my score is:

His signature:

Name & address of pub/arcade:

My name is:

Address:

My high score is:

It was scored on a:

..... machine

Date:

The manager of the pub/arcade who witnessed my score is:

His signature:

Name & address of pub/arcade:

My high score is:

It was scored on a:

..... machine

Date:

The manager of the pub/arcade who witnessed my score is:

His signature:

Name & address of pub/arcade:

Tel:



The three best scorers on each of the most popular machines will be given expenses paid trip to London to take part in the final against one another and a star personality.

Please ensure your entries are witnessed by the arcade manager or operator so we can verify the scores. And be prepared to keep July 7th free if you're particularly proud of your top scores.

If your arcade or pub owner is displaying a 1983 Video Games Championships poster he will also have a dispenser of application forms for you to enter on, should you be reluctant to cut this form out of your copy.

## HELP BUYERS MAKE THE RIGHT CHOICE

When you bought your computer did you go for the one with the impressive pattern display or the one conducting its own sales patter.

Well, Atari is giving you a chance to influence the way its computer is represented in the future.

In conjunction with the high street electronics chain of Dixons and ourselves, Atari is setting up a competition to get your ideas on how its computers can best be presented to the perusing public.

Dixons provides a good example of how high street stores have taken home computers to their hearts. The Dixons shelves are now packed with many different brands battling for attention and giving buyers a chance to run their hands over a host of different keyboards.

But trying out a quick loop can hardly be a buyer's benchmark. He should see the micro running at its best before he makes his judgement. Obviously Atari are confident about their machine but how would you show it in its best light?

An Atari 800 microcomputer goes to the winner, or — if you already own an Atari — you can opt for a disc drive and an equivalent value in Atari software as a prize.

To enter the competition, simply write a program in Atari Basic which sets the computer off to the



## Confessions of a Bug

Dear all,

Only one thing to come clean on this issue. For all you T.I. 99-ers who couldn't pass our colour blindness test on Ski-ing in May, I've got to warn you about the perils of snow glare.

Any irate phonecall or a letter to the offices of C&VG will result in a



best advantage. Making the best use of the colour graphics and sound facilities of the machine.

The best of the programs will hopefully feature in future Dixons store demonstrations, helping to entice people to buy Atari computers.

There will also be three runners-up prizes of the latest Atari software.

## SEVENTH CHANCE TO ENTER

The reappearance of The Seventh Empire has been met with roars of approval from the players and groans of horror from the poor devils who are tied to the Empire computer while it decides the fate of the galaxy.

But with a Colecovision as the star prize in the game, we couldn't let the game suffer its demise for too long. So it will soon be making a triumphant return — allowing a fresh start to all those who may have lost a fleet.

We can now replace players who have had to drop out of the game for one reason or another. So if you have been disappointed in the past, not to be playing Seventh Empire, then we are offering another chance.

First come, first served I'm afraid

purely black and white listing being returned to you in the post.

The editor assures me that hands have been chopped off and the people responsible been assigned to work on the Seventh Empire.

Meanwhile here are some corrections:

300 FOR M=A TO B  
730 IF (C=70) + (C=73) ...  
980 CALL CHAR (35, "3C4299 ...  
1310 FOR M=1 to 600  
1430 DATA 30, 11, 1, 1, 12, 10, 11, 12, 29,  
30, 12, 1, 1, 13, 9, 14, 13, 22, 30, 13, 1, 1, 14,  
8, 15, 14, 21, 3, 0, ...  
1490 DATA 3, 8, 3, 5, 5, 5, 5, 8, 2, 11, 4, 11,  
4, 17, 6, 17, 3, 22, 5, 22, 7, ...  
1460 DATA 13, 19, 10, 15, 12, 15, 8, 10, 10,  
10, 10, 7, 12, 17, 13, 2, 13, 4, 16, 4, 16, 2, 17,  
9, 19, ...  
1580 FOR X=8 TO 14 ...  
2230 CALL HCHAR (24, 1, 32, 32) ...  
2260 CALL HCHAR (XX, Y, 9, 120)

Yours Mal.

Judging will commence on June 16th and we'll need your entries in by then.

My own view of in-store displays of microcomputers is that they era on the side of the technical and verbose, instead of getting down to demonstrating some hot game action. But, luckily, it is being judged by Dixons' and Atari's experts, so you'll have a free reign to produce the best display for all kinds of computer usage.

The competition is not open to employees of EMAP, Dixons or Atari or their relatives and the judges' decision will, of course, be final.

but fill in the form below and we will do our best to include you.

Please include me in the Seventh Empire game when it resumes.

I would like to name my tribe the .....

My name is: .....

Address: .....

Tel: .....

# SPECTRUM

## NEWS

from SPECTRUM

### BBC

Now from SPECTRUM the outstanding BBC 'B' machine plus, Disk Drives & software see ad. opposite for details.

### PRESTEL

See PRESTEL Page 600181 for up to date information from SPECTRUM

### VISCOUNT DISK DRIVES

Coming soon! a fabulous new range of Disk Drives specially selected by SPECTRUM from under £200 total suitable for most micros inc. LYNX, COL, GENIE, DRAGON etc. Ask your local SPECTRUM dealer for further details.

### NEW SPECTRUM MEMBERS

Check our address page! - there are many new SPECTRUM dealers throughout the UK so there's a good chance there'll be a SPECTRUM centre near you.

### INTRODUCING SPECTRUM FACTS!

Next to many of our offers, you'll find a few lines tagged SPECTRUM FACTS. We pride ourselves on providing you, the customer, with a genuine service as well as super LOW prices, and we want you to know that when you buy from a SPECTRUM dealer, you'll get exactly the right micro for your needs. SO LOOK OUT FOR YOUR SPECTRUM FACTS!

### AFTER SALES CARE

SPECTRUM service centres will ensure that should your machine 'go down' we will get it running again as quickly as possible. We also offer extended warranties at reasonable prices too! - ask your SPECTRUM HOME COMPUTER CENTRE for full details.

### COMPUTER DEALERS

The SPECTRUM dealer list is virtually closed. If your area is free and you'd like to join the waiting list, please write to MIKE STERN, Spectrums (U.K.) Ltd, Burrowfields, Welwyn Garden City, Herts.

## BBC Model 'B' MICRO



Yes, this top selling Micro system is now available from your local SPECTRUM dealer - the BBC Model 'B' offering 32K RAM plus a full back-up of peripherals & software too! It's an infinitely expandable machine, ideal for the home or business and is already widely used for educational purposes in schools - so the chances are your children may already be well familiar with its operation, which must make it the ideal choice for the home too! So if you're thinking of buying a micro you must take a look at the BBC at your local SPECTRUM dealer NOW! - but just one word of warning, initially stocks will be limited and demand is bound to be great, so please phone to check the stock position before making a journey.

BBC 'B' with Disk Interface

£470.50

BBC Disk Interface Kit

£95.00

BBC Single Disk Drive 100K

£265.00

BBC Dual Disk Drive 800K

£803.85

BBC Tape Recorder

£29.90

BBC Acorn Software Cassette

based from

£9.95

BBC Disk based software

£11.50

### Spectrum Price

**£399.00** INC. VAT

### Please Note!

We regret that there is a tremendous shortage on all BBC equipment - please phone your nearest store before making a journey to check stock position.

### SHARP MZ-80A



**FREE!**  
£75 WORTH  
of software  
with every MZ80A  
purchased

Desk top genius! the all-in-one SHARP MZ-80A. Ready to run the moment you get it home. Built-in keyboard, CRT, 9" display and cassette data storage with 48K RAM. The MZ80A with extra useful additions, offers quite a powerful micro for the home or business. ■ 4K Byte ROM ■ 48K Byte RAM - 2K Byte Video RAM ■ ASCII profiled keyboard - numeric pad ■ 2page Video RAM allows screen to be scrolled up or down. ■ 97PM available.

**Spectrum Price**

**£546.25** Inc. VAT

Floppy Disks and Accessories for MZ80A

Two Floppy Disk unit (inc. 1/2 Card, Disk, Cable) ... £356.75

Twin Disk Unit (only) ... £878.50

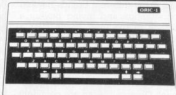
Single Floppy Disk Unit ... £460.00

Cable for F/D Drive ... £29.70

Printers and Accessories for MZ80A, MZ800 & MZ801

80 Col Tractor Feed Printer inc. Cable, 1/2 Card & Rom. £477.25

### ORIC-1



A superbly designed and engineered micro and great value-for-money from SPECTRUM. Offering 48K RAM Colour - 10 foreground and 6 background can be displayed at same time. High resolution graphics user definable Graphics. Full sound inc. octaves of comfortable sound! Easy to use keyboard with moving keys. Standard Centronics parallel interface allows easy connection to a wide range of printers etc.

**Spectrum Price**

**£169.95** Inc. VAT

### SPECTRUM FACTS

Maximum user RAM ..... 47,870 Bytes  
Text screen ..... 26x40  
High Resolution ..... 240x200  
Cassette Lead ..... Included

## The powerful and infinitely expandable



Just look at this super new LYNX Micro - an incredible 16K & 32K video ram and that's expandable up to or beyond 96K. For just £225.00 INCLUDING VAT the LYNX is exceptionally versatile. All LYNX's 'add-on' connections are standard types. The high definition colour graphics make it a top value choice for the home or office (with expansion, the LYNX can become an 80 characters-per-line word processor!) Take a look at the LYNX - a memorable bargain from SPECTRUM. But please phone to check stock position before making a journey as this machine is bound to be in great demand.

### Spectrum Price

**£225.00** Inc. VAT

VISCOUNT - Teach yourself LYNX BASIC £6.95

#### SPECTRUM FACTS

Maximum user RAM..... 13,700 Bytes (approx)  
Text Screen..... 24x30  
High Resolution..... 265x248  
Cassette Lead..... Included

## COLOUR GENIE



A truly reliable micro and highly recommended by SPECTRUM featuring powerful and sophisticated COLOUR GRAPHICS, allowing you to create full 8-colour Games, Diagrams and charts quickly and simply. Powerful 16K RAM memory (expandable internally to 32K) for FULL COLOUR video games and POWERFUL COMPUTING with a full range of inexpensive accessories: 16K RAM pack, Joysticks for TV Games, Light Pen, Disk Drive and a Printer. The superb Colour Genie is at SPECTRUM now - check it out and see the Genius at work!

**Spectrum Price** **£224.48** Inc. VAT

#### COLOUR GENIE ACCESSORIES

Joysticks..... £49.49  
16K RAM..... £38.50  
Printer Interface..... £39.95  
VISCOUNT Teach yourself Colour..... £6.95

#### SPECTRUM FACTS

Maximum user RAM..... 14,200 Bytes (approx)  
Text screen..... 24x30  
High Resolution..... 265x248  
Cassette Lead..... Included

# SINCLAIR ZX SPECTRUM



Yes, this top selling micro is now available from Spectrum in both 16K and 48K RAM. So now there's no need to send by Mail Order - just call into your local SPECTRUM dealer and pick one up. But just one word of warning: with this added availability advantage, stocks are bound to sell fast - so make it soon!

**SINCLAIR ZX SPECTRUM 16K** - £99.95  
**SINCLAIR ZX SPECTRUM 48K** - £129.95

Spectrum Computer Centres have no connection whatsoever with the ZX Spectrum Computer manufactured by Sinclair Research Ltd.

## SINCLAIR ZX-81

**SINCLAIR ZX** . . . £49.95  
**16K RAM pack** . . . £29.95  
**ZX Printer** . . . £39.95

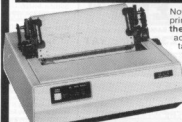
Computer Bookshop INC.  
Software for Sinclair VAT  
Computers..... £5.95  
Bumper 7 1K ZX81..... £5.95  
1K Super Trio ZX81..... £5.95  
Labyrinth 16K ZX81..... £5.95  
Nightmare Park/Music 16K ZX81..... £5.95  
Computers: 16K ZX81..... £5.95  
Personal Banking System..... £11.44  
16K ZX81..... £5.95  
Space Invaders/Rescue 16K ZX81..... £5.95  
Breakout 16K ZX81..... £5.95  
Maze 16K ZX81..... £5.95  
Mangrove 16K ZX81..... £5.95  
Prosmager 16K ZX81..... £5.95  
Football Manager 16K ZX81..... £5.95  
Cassettes for ZX81 Type-10 6 Games..... £3.95

Junior Education..... £3.95  
Business & Household..... £3.95  
Skill & Judgement Games..... £3.95  
Junior Education..... £3.95  
Family Quiz..... £3.95  
Type-20..... £4.75  
Fantasy Games..... £4.75  
Space Raiders & Bombers..... £4.75  
Type-30..... £4.95  
Soccer Programme Nos. 1-8..... £4.95  
Type-40..... £5.95  
Backgammon..... £5.95  
Flight Simulation..... £5.95  
Type-50..... £5.95  
English Literature 1..... £5.95  
English Literature 2..... £5.95  
Geography..... £5.95  
History 1..... £5.95  
Maths 1..... £5.95



**ZX-PANDA**  
**16K RAM PACK**  
**ONLY £24.95**

## OKI MICROLINE Printers



Now from SPECTRUM - this top selling range of printers renowned throughout the world for their quality and reliability. If you're thinking of adding a printer to your micro then you must take a look at the MICROLINE range at SPECTRUM - NOW! they're fantastic value-for-money

Models available

**MICROLINE Model 80** £259.90  
**MICROLINE Model 82A** £455.40  
**MICROLINE Model 92P** £585.35

## EPSON



**The new EPSON RX-80** and FX printers now available - check with your local SPECTRUM dealer NOW!  
**FX-80 Spectrum Price** £503.70  
**RX-80 Spectrum Price** £332.35

#### SELECTION FROM THE COMPUTER BOOKSHOP

30 Hour Basic for the BBC Micro..... £5.95  
Let your BBC Micro Teach You to programme..... £5.95  
BBC Micro Revealed..... £7.50  
Over the Spectrum..... £4.95  
60 Games and Applications for the ZX Spectrum..... £5.95  
Programming the £502..... £5.95  
Program your ZX Spectrum..... £5.95  
SAY Pse Book for the Vic 20..... £5.95  
The ZX Spectrum Explained..... £5.95  
Vic Input Computing..... £5.95  
Mastering Machine Code on your ZX81..... £7.50

## SEIKOSHA



**GP-100A**  
Now a top quality graphic printer at a price you can afford. Centronics interface connects easily with most micros.  
Spectrum LOW price £229.94 Inc. VAT  
Cables & Interfaces available for most micros

## SMITH CORONA



**Model TP-1**  
Microprocessor controlled, high quality daisy wheel printer at a LOW cost from SPECTRUM. Serial, Parallel or IEEE Interface.  
**Spectrum Price** £557.75 Inc. VAT

## BOOKS



The ZX Spectrum and how to get the most from it..... £3.95  
Easy Programming for the ZX Spectrum..... £3.95  
30 Programmes for the BBC Micro..... £4.95  
CPU Hardware..... £11.50  
Programming the Z80..... £11.95  
20 Best Programmes for the ZX Spectrum..... £5.95  
Getting acquainted with your ZX 20..... £5.95  
Machine code and Better Basic..... £7.50  
The Cambridge Colour Collection (Spectrum)..... £5.95  
Vic Revealed..... £10.00  
De Re Alan..... £17.00  
ATAI Operating system listing..... £10.43

## MORE SPECTRUM LOW PRICES

# ATARI 800

## A few examples from our SOFTWARE Selection from independent software houses

Now with  
**48K**  
RAM  
and still at the same  
LOW price!

Now this proven and tested machine has been upgraded to a massive **48K RAM** and its still at the amazing **LOW price of £399.99** from SPECTRUM. It's an ideal Home Micro for graphics, educational and personal finance etc. use it and it will take you from learning up to a small business use. You can add printers, program recorders, disk drives and more, to expand your micro as and when you want, to suit your needs. So if you're looking for a top of the line micro you must see the **ATARI 800 with 48K at SPECTRUM - NOW!**

TNDRM ENI	
Software for ATARI	inc. VAT
Submarine Commander	£34.44
Junior Jet Pilot	£34.44
Soccer	£29.84
Kickback	£29.84
Home Financial Management	£19.49
Darts	£19.49
Snooker & Billiards	£19.49
Pole	£19.49
Billiards & Games	£19.49
Copilot 4 & News	£24.25
Mighty Hero	£24.25
Software for Commodore	£25.24
River Rescue	£25.24
Mr. Music Composer	£25.24

GEN	
Software for ZX81, Dragon	inc. VAT
Monster Mine (for ZX81)	£4.95
Monster Mine (for Spectrum)	£4.95
Monster Mine (for Dragon)	£7.95
Space Mission (for ZX81)	£4.95
Space Mission (for Spectrum)	£4.95
Space Mission (for Dragon)	£7.95
Dragon Soft	£7.95
Dragon Character Generator	£7.95
SALAMANDER	
Games for Dragon 32	inc. VAT
Wizard War	£7.95
Wizard War	£7.95
Vulcan II	£7.95
Games Conquest DI	£7.95
Soft	£7.95
RABBIT	
Software for Commodore	inc. VAT
VIC20	£5.99
Space Storm	£5.99
Dr. Run	£4.99

KUMA	
Software for Sharp	£9.20
Electron 25622	£12.08
Orbiting	£12.08
Adventure	£16.68
Chess	£16.68
AUDIOGENIC	
Programs for VIC-20	inc. VAT
Amok	£6.95
Alan Blitz	£7.95
Soft	£7.95
Spiders of Mars	£19.95
Games & Monsters	£19.95
Beats	£7.95
Trachman	£7.95
Beats	£14.95
Tank Attack	£19.95
Word Club	£12.00

## ATARI 400 16K RAM



**NOW ONLY**  
**£159.95**  
INC. VAT  
**BASIC cartridge extra**  
**£39.99 inc. VAT**  
(£34.77 ex. VAT)

## SPECTRUM FACTS

Maximum user RAM.....13,320 Bytes  
(with basic Cartridge) 24 x 192  
High Resolution.....320 x 192  
Cassette Load.....Needs own Recorder

**ATARI DISK DRIVE**  
**£299.00**  
INC. VAT

## ACCESSORIES, BOOKS & GAMES FOR ATARI

Accessories	
Thermal Printer	£198.95
16K RAM Pack	£65.00
40K Keyboard	£59.95
32K RAM board (400/800)	£75.00
40K RAM board (400/800)	£95.00
Paddles (Pair)	£13.95
Joysticks (Pair)	£13.95
VIC Cable	£12.95
Printer Cable	£25.50
Monitor Cable	£25.00
Thermal Paper	£4.50
Postmaster Joystick	£14.95
Onboard Joystick	£14.95
Keyboard for Atari 400	£60.00
Books & Manuals	
Wiley Manual	No VAT
Basic Reference Manual	No VAT
DOS 2 Manual	No VAT
Operating System Listing	No VAT
DOS Utilities Listing	No VAT
Home Computer Programs - Home/Office	
Word Processor (Disk)	£59.95
Mortgage & Loan	£14.95
Microsoft Basic (Diskette)	£59.95
Home Study (Cassette except where stated)	
INT. to programming 1	£19.95
INT. to programming 2	£22.95
INT. to programming 3	£22.95
Conversational French	£39.95
Conversational German	£39.95
Conversational Italian	£39.95
Conversational Spanish	£39.95
European Countries & Caps	
Hungary	£14.95
Kingdom	£14.95
States & Capitals	£14.95
Teach Typing	£19.95
Music Composer (Cartridge)	£35.95
Home Entertainment (Cartridge except where stated)	
Galaxian	£29.95
Defender	£29.95
Asteroids	£29.95
Basketball	£24.95
Backpack (Cartridge)	£14.95
Covers of Mars (Disk)	£29.95
Centipede	£29.95
Computer Chess	£24.95
Missile Command	£29.95
PAC Man	£29.95
Space Invaders	£29.95
Star Raiders	£29.95
Cribbage & Domino	£19.95
European Scenic Dig-tow	£19.95
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Assembler Editor	£39.95
Atari Basic Cartridge	£39.95
Macro Assembler (Disk)	£59.95
Pilot (Consumer)	£59.95
Pilot (Educator)	£59.95
Entertainer Kit (Star Raiders Missile Command & Pair Joysticks)	£69.95
Programmer Kit (Basic Cartridge & Manuals)	£39.95

## ACCESSORIES

**SANTYO Colour Monitor**  
**CD03125N**  
**£226.85**

SANTYO	inc. VAT
SANTYO 12" green monitor	£190.85
Use 36 Cassette Recorder	£29.95
C12 Cassettes	£30.50
Single-sided double density disks (Box of 10)	£21.25
Double-sided double density disks (Box of 10)	£21.25
Disk head cleaner	£16.10

Single part 11" x9" printer paper, box of 2,000 sheets	£13.05
VIC Accessories from Viscount	£24.95
Motherboard without Buffer	£79.95
16K RAM Pack	£43.95
32K RAM Pack	£69.95
64K RAM Pack	£114.94
Cumulative Character/Voice Synthesiser	£57.45

## DRAGON



**Spectrum Price £199.95**

VISCONT Teach yourself Dragon Basic. £6.95

Unbelievable value from SPECTRUM! Extensive facilities include highly advanced colour graphics. Powerful standard 32K RAM (expandable to 64K Bytes). 16 Colour 5 resolution Display. 4 Extended Microsoft colour BASIC (as standard). Advanced sound with 5 octaves - 255 tones.

SPECTRUM FACTS	
Maximum user RAM.....	29,676 Bytes
Text Screen.....	16x32
High Resolution.....	256x192
Cassette Load.....	Included

## JUPITER ACE



## SPECTRUM FACTS

Maximum user RAM  
1,000 Bytes approx.

Outstanding value-for-money! The JUPITER ACE uses easy to understand FORTH language. 3K RAM EXPANDABLE to 16K. Full moving keyboard with auto repeat and caps lock. Full sound and chunky graphics.

Spectrum £89.95	
Price	
NI-TECH Software for JUPITER	£5.99
Memory Scans	£5.99
Cavern Attack	£5.50
Micro Maze	£5.50
Space Battle	£4.50
Ace Invaders	£5.50
Green Cross Frog	£4.80

## COMMODORE 64



**Powerful 64K RAM**  
40-colour displays to monitor TV. High resolution graphics and 3-dimensional effect capability, music synthesiser. Z80 additional processor option.

**Spectrum Price**  
**£345.00**  
INC. VAT  
**VIC 20**  
**Spectrum Price £129.90**

**SPECTRUM**  
**Special!**  
**AMAZON**  
Business  
Software for  
**ATARI 800**  
at less than  
**HALF PRICE!**  
Key Account  
**ONLY £69.00**

Key Word  
**ONLY £69.00**



# There's a Spectrum Centre near you ...

## ABERYSTWYTH

AberData at Galloways,  
23 Fawcett St. 01793 815322

## ABINGDON

Ivor Fields Computers,  
21 Sturt St. 0235 21207

## ACCRINGTON

PV Computers, 38A Water St.  
0534 3652132811

## ALDERSHOT

David Saunders Computer Centre,  
51 Station Rd. 01753 815322

## ALFRETON

Gordon Harwood, 95/71 High St.  
01773 815322

## BARBURY

Computer Plus, 2 Church Lane.  
01961 65880

## BARROW-IN-FURNESS

Barrow Computer Centre,  
86 Church St. 0229 38955

## BASILDON

Goffrey's, 28-32 East Walk,  
Town Centre, 0268 288379

## BASINGSTOKE

Fisher's, 12 Market Place,  
0256 22979

## BATH

Software Plus, 12 York St.  
0252 61676

## BEDFORD

Stead Ltd., 115 Midland Rd.  
0234 49341

## BELFAST

Arthur Heaton Ltd.,  
237 Great Victoria St. 0232 24636

## BIRMINGHAM

Sherrards, 600 Western  
Arcade, 021 236 7271

## BOSTON

Felonsdon Computers,  
19 Dalhousie Lane, 0205 64781

## BRADFORD

Phonetics, 10 Chapgate,  
0234 30556

## BRIGHTON

Captains, 1 Queens Rd.  
0273 29634

## BRISTOL

Bussell Computers Ltd.,  
24 Park Row, 0272 294187

## BURNLEY

IMC Computer Centre,  
340 Stands St., 0222 54299

## BURY (Lancs.)

Micro-North, 7 Broad St.  
Tel. 061 797 3984

## BURY ST. EDMUNDS

Bury Computer Centre,  
Tel. 081 797 3984

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# NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS N GAMES NEWS

## DISCOVER THE HIDDEN KEY TO TREASURE

### PHAROAH'S TOMB

Travel back in time to ancient Egypt and explore Pharaoh's Tomb. This is the opportunity afforded to Vic owners in the latest game from Anirog Computers.

In order to get into the inner chamber of the tomb you will need to find the four hidden parts of the key. To assist you in your travels you will also have to collect other items such as an axe, a spade, and apple, and a lamp.

Pharaoh's Tomb runs on the 16k machine and is available from Surrey based Anirog at £6.00.

Two other new games from Anirog this month for the Vic 20 are a version of the arcade game Donkey Kong called Krazy Kong, and a space shoot out — Xenoll — both requiring a 16k expansion and both will sell at the slightly dearer price of £7.90.

## HUNT THE WIZARD'S TREASURE

### KNIGHT'S QUEST

The Knight's Quest is to find Merlin's treasure and take it safely back to the castle.

This part text and part graphic adventure divides the screen in two with a screen for pictures in the top half and scrolling text in the bottom.

In order to find Merlin's gold ingots, jewels, Magic Ring and Seeing Mask you will have to explore 120 rooms.



On your journey you will have to battle elves, scorpions and dragons, rescue a beautiful princess from the Wizard of Trill, visit the Witches' Tower and the Valley of the Seven Rocks, and journey underground into secret chambers, which can fill with water and drown you.

The game also features a reincarnation routine which can be useful if you get on the wrong end of an elves spear or a Wizard's spell.

Also useful is a Save fund which enables you to stop the game at a certain point and take up where you left off a few hours or days later.

The Knight's Quest is available from Surrey-based Phipp's Associates at £5.95 for the

Spectrum version in 48k and £4.95 for the ZX81 version in 16k.



## THE DEMONS INVADE ENGLAND

### DEMON ATTACK

America's top selling video game of 1982 is now available in home computer format in the UK.

Imagic's Demon Attack, the shoot 'em up game with no less than 84 waves of exquisitely drawn aliens has been converted for use on the Atari 400/800 and the Vic-20.

The game has been so popular in the US that its designer, Rob Fulop, recently received the award of designer of the year.

The game is imported into the UK by Hales of Yorkshire and costs £29.08. The Atari version is available now and the Vic 20 version will be in the shops in June.

Another well known Imagic video game — Atlantis, an under-sea battle — is also in the process of conversion for the Vic and the Atari home computers.

The next large video games manufacturer to follow in Imagic's footsteps is likely to be Parker Brothers of Empire Strikes Back and Frogger fame who have lined up some of their games for a July launch on home computers.

## MY, WHAT A NICE GAME YOU'VE GOT

### WOLF TRACKS

A villainous wolf haunts the wood in a new computer game idea based around the fairy tale, Little Red Riding Hood.

The game is unique to the Colour Genie computer and welds the elements of the children's story into a tactical game which Genie manufacturers, Lowe Computers, hope will have several spin-offs.

The first version, Wolf Tracks, features Little Red Riding Hood picking primroses in the wood and gradually filling her basket, unaware of the lurking wolf. She must avoid spilling primroses and bumping into trees and the poor girl is occasionally dive-

bombed by aggressive birds.

When a basket is filled it should be taken to granny's house and the primroses used to fill vases on the windowsills of the cottage.

The real danger in the wood is the wolf. He leaves his tracks in a trail of red primroses which our heroine crosses at her peril as the wolf will attack her if she does.

The games also features a woodcutter, who can be called upon to bring his hatchet and try to destroy the wolf. But as time marches on in the wood the march of the red primroses continues leaving even more of the screen unpassable.

The Genie's analogue to digital joystick, which increases the player's speed, the further it is pushed in any direction, plays an important part in Wolf Tracks.

It will retail at around £5-6 although a final price had not been decided on as we went to press. The game is available through the Colour Genie Users Club at 46 Highbury Avenue, Bullwell, Nottinghamshire or through Lowe themselves in Matlock.

Other versions of the game are currently being planned.

## HORRORS FROM THE HEAVENS!

### TERROR-DAKTL

As the sun sets your blood runs cold as an unspeakable horror pours out of the heavens. Swooping monsters after your flesh. Bird-like and scaly. Creatures not of this world.

Armed only with a battered pistol you will need all your skill as marksman as night falls. Darkness follows shortly but still the monsters come. Their eyes shining brightly like distant twinkling stars.

Terror-Daktal 4D is the latest 48k game from Melbourne House software — the people who brought you the Hobbit and Penetrator.

The games fourth dimension mentioned in the title refers to the fourth dimension of time which is incorporated in the game in the shape of the setting sun. The game is available from W. H. Smith at £6.95.



# NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS GAMES NEWS

## GET ALL TIED UP IN KNOTS

### KNOT 3D

The Games News team was managed to sneak a preview of the latest game from New Generation Software — the one man software house of 3D Tunnel fame.

Called Knot 3D the game offers a totally original scenario. An X is positioned at the centre of the screen and appears to move into the screen as walls and shapes loom in front of you.

In the words of the game's designer, Malcolm Evans, the idea of the game, "is to avoid collisions with your own green/yellow trail, and those of up to four chasers, as you rush through an empty three dimensional space.

As more trails are laid it becomes increasingly difficult to thread your way through the knots created".

The game will be available at W. H. Smith at the end of June.

It will run on the Sinclair Spectrum in 16 or 48k and will sell for £5.95.

## CALLING ALL VORCON WARRIORS!

### VORCON WARS

Here's a game which reflects your personality in the way you play it.

The planet Vorcon is open for plunder. Ruthless people will risk all in an attempted attack on Vorcon. More cautious players will cultivate land to feed their people or spend their resources on drilling for oil.

Vorcon Wars is a brand new play by mail game. The ultimate aim is to become a nuclear power. Towards this end you will have to plan projects such as the construction and launch of a satellite for surveillance and to aid in the transportation of men.

Vorcon Wars is the invention of John Nicholson of Bracknell, Berkshire. Each turn costs £1 plus a further £1.50 for the first three maps and the book of rules.

The C&VG Games News team have entered Vorcon Wars and will be keeping you up to date on happenings on the planet.

Each player receives from the organiser two computer printouts. The first of these show the immediate territory around your home base. The various land uses are represented by hexagons, i.e. industrial, agricultural, weaponry.

The second printout gives you a detailed printout of how your resources were used in the previous go with your current status in all areas.

## TREASURE HUNT FOR A CHAMPION

### ROMIK CHALLENGE

Big cash prizes are being offered by Romik software to players who achieve good high scores while playing some of their new games.

The offer is part of the firm's search for a world champion Romik games player.

Each new cassette contains a yellow entry form for the Grand Master competition. As well as the cash star prize the winner will receive one copy of each new Romik game for one year.

New games this month from the Slough-based firm are Time Destroyers — a scrolling shoot up with a variety of aliens to be blasted. Destroyers is Romik's second space game for the expanded Vic and required 3, 8, or 16k Ram expansion.

Unexpanded Vic owners have also been included in this month's new release — Space Fortress is based on the popular arcade game — Phoenix. Powerblaster is a maze chase game with a shoot 'em up space theme.

Romik have also branched out into two other computers with the launch of their first game for the ZX81 and the BBC machine.

Super Nine is a selection of nine games on one cassette for the 1k ZX81. BBC owners are given Birds of Prey — a shoot up with bird-like aliens.

Romik's Vic games are available from Lasky's and other computer shops at £9.99. Prices have yet to be confirmed on the BBC and ZX81 games.

## THE CHICKENS COME HOME TO ROOST!

### CHICKEN

What goes cluck, cluck splat? A chicken trying to get across a busy motorway of course!

If you want the chicken to survive then you'll need considerable skill and the latest cassette from the new Vic-20 software house Micro Antics.

Chicken Challenge is based on the arcade game Frogger. You must get five chickens safely across the road in as short a time as possible.

Just one thing you should know. This is no ordinary motorway. Along with the lorries and cars you will also see Diving Ducks, and chicken pies on the conveyor belts, and a thieving fox.

Also new from Micro Antics this month is a children's game. The game is Called Brain Panic and, like Chicken Challenge, is for the unexpanded Vic. In it you have to match up trains, animals and other objects. Brain Panic is based on a children's card game.

Both games are available now from Micro Antics of Staffordshire at £5.90.

## TALK ME THROUGH THIS ONE!

### PARSEC

"Good shoot pilot" croons the female voice of your ships battle computer as you hurtle through space, guarding your eyes from the blinding flashes of light as your laser fire blasts the aliens.

Two light years further and she speaks again, "Time to refuel". This is a tricky exercise as you must fly your craft through a narrow tunnel. But take heart. Your electronic companion is quick to congratulate you if you successfully complete the exercise.

Parsec is one of two new games from Texas Instruments for the TI 99/4a incorporating their add-on speech synthesiser.

You are at the controls of a space ship scrolling from left to

right against a background of stars. But don't let your one directional movement lead you into the mistaken belief that the aliens will conveniently attack from one direction as well. They won't. They will come at you from behind as well as from the front.

There are sixteen different types of aliens to be destroyed — all capable of unique attack strategies.

The second new talking game is called Alpinar and features a far wider vocabulary than Parsec.

You play the part of the intrepid mountaineer, bravely clambering over the slippery slopes, falling boulders, battling snakes, avoiding fires, and even an eagle which attempts to bomb you with a giant golden egg.

Your commentator is always ready with a cutting remark when you make a false move. "Did you mean to do that?" she sarcastically enquired when I tumbled to the ground after being hit by a falling boulder.

It is difficult to resist making mistakes on purpose in Alpinar just to see what will be said next!

Alpinar and Parsec are available from your Texas dealer now at £31.95. The speech synthesiser is available at £49.95.



Illustrations: Jon Davis

# NEW PRODUCTS NEW PRODUCTS NEW PRODUCT GAMES NEWS

## BACK TO THE BATTLE OF BRITAIN

### SKYHAWK

The scene is a sleepy village set among the hills in the heart of the English countryside. The date is 1943 — the height of World War II and the Battle of Britain.

Suddenly, the tranquility of a hot summer day is broken by the roar of German aircraft engines flying in low to dodge coastal radar.

The lives of many people depend on you — a lone fighter pilot facing a squadron of enemy aircraft. This latest game from Quicksilver, called Skyhawk, for the Vic-20 puts you in the hot-seat — defending your homeland from a deadly attack. Keep a careful eye on your fuel supply. You may have to land to refuel during the battle.

Skyhawk runs on the Vic with 3k or 8k expansion and is the second game from Quicksilver for the Vic. It is available now from the Southampton-based firm at £7.95.

Spectrum owners have not been left out of this month's new releases with two new arcade style games.

Astroblaster is a multi-wave shoot 'em up with an assortment of tough aliens. Frenzy is a robot attack game in which you must fight it out with deadly droids. Both games run on 16k or 48k machines and are available from HQ at £4.95 each.

## STOCKS AND SHARES ON THE MARKET

### STOCK EXCHANGE

New software house A.S.L. are understandably bullish about their new game for the Oric.

The game is called Stock Exchange and enables you to dabble with stocks and shares for the afternoon without causing your bank manager to burst a blood vessel.

The game displays the continuously updated performances of nine companies. You must buy



and sell shares to make money. Borrowing is allowed but not always advisable.

On the B side of Stock Exchange is a bonus program called Etch-a-Sketch which features a movable cursor, shading in any colour which you can select from the list on offer.

Stock Market and Etch-a-Sketch are available from the Wrexham based firm at £4.

## THEATRE OF DEATH AND DESTRUCTION

### SHEVA

Budding Masterminds reading this will not need to be told that Sheva is the Hindu god of destruction.

The less well informed amongst you may also be interested to learn that Sheva is the name of the latest game from Red Shift Software which simulates the conflict involved in Europe during World War III.

The game features a scrolling map of Europe. The cities which you have chosen at the beginning of the game may be annihilated by nuclear warheads if you are not careful.

Sheva is the follow up to Red Shift's Timelords — a complex computer-cum-boardgame for the BBC model B, at £7.95.

Sheva runs on the 48k Spectrum and is available from the London based Red Shift at around the £7 mark.

## JACK JUMPS JUST LIKE A FROGGER!

### JUMPIN' JACK

Jumpin' Jack Flash he's a gas, gas, gas. Well — more precisely, he's a brand new Frogger type game for the unexpanded Vic-20.

Hopping from log to log, and then on to turtles, you must jump your little green friend across a fast flowing river.

Jumpin Jack is just one of a wide range of games which have just been released for the Vic-20 from Sumlock.

In this month's batch is a Galaxians-type game called Triad and a version of Scramble. All three games run on the unexpanded machine and are available at £7.95.

Also new from Sumlock this month for Vic owners is an adventure game requiring a 16k expansion.

Starship Escape challenges you to find the various bits of your spacecraft which have been hidden by aliens in their giant spaceship. Starship is available at £9.95.

## THE BIRDS FLY HIGH WITH VIC

### FIREBIRDS

Cosmic Firebirds — the arcade game with the spiralling aliens — has at last been converted for the Vic-20.

Firebirds is the latest offering from the new software house — Solar Software.

Other games in the range so far include tried and tested favourites — Galaxians, Scramble, Super Breakout, Gunfight, Asteroids and Munchman.

The games are available from Currys Micro C and direct from Solar Software at £5.95 for Gunfight, Asteroids, and Munchman, and £6.95 for Galaxians, Scramble and Super Breakout.

All of the games run on the unexpanded Vic except Cosmic Firebirds which runs on the Vic with an 8 or 16k expansion.

## TUNE IN TO THOSE NEW MICRO WAVES RADIO PROGRAMS

Home computer owners in the West Country can now tune into a free bank of software on their local commercial radio station — Radio West.

C&VG spoke to Zorte, real name Edwin Tozer, Radio West's computer program presenter. "The program goes out on Monday evenings between 7.30 and 8.00 pm. We cover computer news, run competitions, and broadcast short computer programs — usually no more than about fifteen seconds in length."

Subjects covered so far have been multiplication, Morse code, and a graphics package for the ZX81 which was programmed to draw a picture of a face.

No games have been broadcast as yet but Zorte is working on a Breakout type game for the BBC machine, and soon Radio West will be ready to broadcast their first game.

As well as the short programs broadcast during the programme Radio West also broadcast longer programs after the station has finished normal transmission.

These longer programs have been mainly educational, with some business applications. Machines for which software has so far been broadcast are the Dragon, ZX81, BBC, Epsom, Newbrain, Atari and the Oric.



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# NEW PRODUCTS NEW PRODUCTS NEW PRODUCT GAMES NEWS

## THE DRAGON SPREADS ITS' WINGS!

### FLIGHT SIMULATION

Up, up and away go Dragon owners with a flight simulation written by a professional pilot.

The game challenges you to safely take off and land a small plane. You have all normal flight controls including an instrument landing system and vertical speed indicator.

Flight Simulator runs on a Dragon in 16k and is available from Salamander Software of Brighton at £9.95.

## DAMSELS IN DISTRESS NEED HELP!

### WIZARD

Wizard takes you back to a fantasy land of spells, demons and beautiful maidens with flowing golden locks.

But if you think this is a fairy tale adventure game you would be wrong. Wizard is an arcade style game with a few original twists of its own.

The demons are attacking your planet — swooping down and abducting the maidens who are helpless against their superior strength.

Your job is to save them before they are brought back to the evil king who will put them to death in a ceremonial sacrifice.

Several waves of demons must be dealt with — together with cunning little bugs who come at you intent on destruction.

Wizard runs on the BBC model B in 32k and is the latest game from Quicksilver at £6.95.

Also new for BBC model B owners is a monster attack game called Protector. The monsters are attacking scientific installations in an isolated part of your planet. The game gets faster and faster as you drive your craft from base to base, blasting the invaders. Watch out also for the occasional monster which grows larger as the game progresses.

The third Beeb offering from Quicksilver this month is a boxed Music Processor which enables you to exploit the musical capabilities of the BBC A or B.

The Music Processor costs £14.95, you get a 30-page instruction manual included in the price.

Quicksilver's original customers — Britain's one million plus ZX81 owners have not been left out of this month's new releases.

Four new games are on offer for the 16k machine. Ocean Trader is a seafaring simulation enabling you to play captain of the ship. Pioneer Trail takes you back to the wild west, and Black Star is 3D shoot 'em up. For arcade addicts there are also versions of Amidar, and Pacman.

## WORDS OF WISDOM, AND GAMES!

### TEXAS BOOK

Texas owners can look forward to 35 new games to enter into their software starved computer when a new book goes on sale later this month.

The Texas Program Book contains 35 listings which you can enter into your machine. The subjects covered include games, home accounts, and a filing system.

Games highlights are 3D-Maze, horse racing, tennis, and a novel game in which you help a penguin to save its eggs.

The book will be available from Phoenix Publishing Associates at £5.95.

## THE GAMES CAPITAL OF THE U.K.?

### LYVERSOFT

Liverpool is fast becoming the Silicon Valley of the UK for computer games anyway.

The city that gave you Bug Byte and Imagine can now boast a third specialist games software house called Lyversoft.

They have just launched

a range of games for the Vic-20. Apple Bug challenges you to gobble up the life saving apples before the bug catches you. Crazy Climber sets you the equally difficult task of climbing scaffolding and catch balloons floating past to score bonus points.

Space Assault is a Scramble-type game with a difference. Instead of bombing fuel-dumps to refuel as in the arcade game you must dock with the fuel-tankers.

Lunar Rescue puts you at the controls of a ship attempting to land on a planet bombarded by a meteor storm. Your task is to pick up the three marooned scientists and make your escape.

The games run on the 3 or 8k Vic-20 and are available from the Liverpool based firm at £5.95.

## FIGHT THE FLAB, NOT MORE ALIENS!

### DIETRON

Calling all overweight Spectrum owners. If you are becoming flabby and hollow-eyed due to many hours crouched over the keyboard then here is a computerised answer to the problem.

Dietron is a new program designed to enable you to plan your diet.

No, you don't stand on your Spectrum to make it speak your weight. Instead the program asks you a number of questions which "will establish a complete range of values and requirements that are personal to you".

Once your values have been calculated you can jot them down and proceed with your diet, or if you have a printer, make a print-out.

Key 1 to 4 on the Dietron show you the complete range of foods for which information is held. For example key 1 will display information 37 varieties of vegetables.

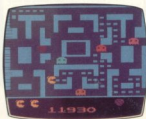
The values can be reset at any time for a second person to receive information. There is also a second program on the tape which is a data bank of nutritional information. Less chips for Spectrum owners from now on!

Dietron runs on a Spectrum in 48k and is available from W. H. Smith at £5.95.



# If you think Pac-Man<sup>\*</sup> is a tough act to follow, meet Ms. Pac-Man<sup>\*</sup>

Make no mistake, this little lady is a screen sensation. More dynamic, more talented than even Pac-Man himself (and he's the world's biggest selling video game ever). Ms. Pac-Man has just what it takes to be a video star. Graphics that are close to arcade quality. Four mazes to amaze you. She even hands out bonus points for audience participation. So visit your Atari<sup>®</sup> stockist and meet Ms. Pac-Man in person. She can't wait for you to give her a screen test.





# THE EVOLUTION OF COMPUTER & VIDEO GAMES (PART 1)

BACK ISSUES



Most computer historians agree that the first known remains of Computer & Video Games date from November 1981. It was then that this magazine first emerged (a little unsteadily) into the primeval twilight of the early days of Sinclair Man.

Then huge computer dinosaurs roamed the Earth, thrusting keen young programmers into their wall-to-wall maws and the magazine looked a little out-of-place surviving on a diet of strange new features and listing material washed up from across the Atlantic.

Naturalists are only now beginning to draw conclusions about the close association between the Computer & Video Games story and a little yellow gobbling creature's own evolutionary niche ...

Let us take a closer look at some of the noteworthy steps in the evolution of both:-

## November 1981

The striping emerges into twilight with Tarot on the Tandy, Musical Hangman on the Sharp MZ-80K, Trench on the Atari, Nibblers on the Pet and Super Nim on the Apple. Keith Campbell kicked off his popular Adventure series, Garry Marshall kicked off graphics with a space invader. There were Pacman arcade tips and Max Bramer looked at the first chess machine, Von Kempelen's Turk.

## December 1981

Growing up fast with Potshot on the Vic-20, Breakout on the Atom, 'Round the Horn' on the Tandy, Mini Golf on the Atari and Pet owners could tackle Rubik's Cube with more confidence. Keith Moti went trouble-shooting on the ZX81 in Kit Korner and Screaming Foul-up fell in love with Terry Wogan.

## January 1982

A new year begins with Ted Ball on the trail of the Bugs in his Practical Programming column. Speed Race for the Texas, Treasure Hunt was a popular Apple adventure — much converted by owners of other machines, three 1K wonders for the ZX81 and Changing Hearts for Atari owners. We also saw a seamier side to gaming with a feature on Softporn Adventure!

## February 1982

Science Fiction author David Langford brought a new look to space games with Space Blockade. Dr Livingstone set up a quest for Sharp owners and Grand Prix gave Tandy owners a racetrack to try out. David Anall POKEd some sounds out of the quieter

micros and Arcade Action announced two Pacman lookalikes.

## March 1982

Robin Bradbeer reported from Las Vegas on a country going video crazy — how right he was. ZX81 owners got to grips with Reversi (Othello), there was Startrek III.4 for the Tandy and Octodraw had the Atari moving in eight directions at once.

## April 1982

Spring came with Tim Metcalfe's feature on pinball, a revitalised sector of the arcades fighting back against Space Invaders. Engineer helped Atari owners rebuild the Golden Gate Bridge, Poker for the ZX81 and Ron Potkin's classic Tandy wargame Kriegspiel. Plus Pacman hit the home Video Screens at last.

## May 1982

Computer Moderated Games were investigated by Terry Pratt (the first thoughts on Seventh Empire were voiced about here). Minotaur took the Vic-20 down into a maze and tried to lose it, Pacman arrived in a CAVG listing on a Pet. Minopoly for up to five Sharp businessmen, Metecustom took Apple owners by surprise and Earthport II won Tandy fans.

## June 1982

The World Cup was upon us and we responded with World Cup Manager — written for the Sharp but without a PEEK or POKE and since converted to many a micro. Vic-20 owners were set afloat on a river torrent in Speedboat, there was Trolls Gold on the Apple and Dog Star Adventure on the Tandy.

It also included issue 1 of our BBC Micro publication, Owl.

## July 1982

Do the arcades have anything to offer the fairer sex? America was wooing women with Ms Pacman and we featured this first lady of the arcades in July. Imhotep took the Apple owners back to ancient Egypt, Moon Shuttle sent the Vic into space and Z-Xtra gave 16 pages over to Sinclair fans.

## August 1982

Haunted House gave Atoms a shudder, Space Hopper made Tandy's jump to it and Rocks made Vic owners roll over and beg for more. Magic launched a range of cartridges for the Atari VCS. Hardcore was given over to a game-player's guide to the Atari and Sue Garden gave us all a giggle with a computer widow's tale.

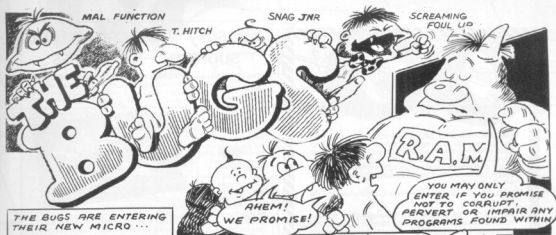
## September 1982

Tron: out of the arcades came Walt Disney's graphically stirring film about being trapped in a computer game. We featured it first. Pacman appeared on the Vic-20, there was Star Wars on the Atom and Colditz Adventure on the Tandy. Issue two of Owl gave BBC owners Speed Trial and X marks the Spot.

## October 1982

CAVG saw out its first 12 issues with Space Watch on the Spectrum, asking you to befriend the aliens before it's too late! Sharp Defender, Galaxian Colony II on the Apple and the controversial Wild Strawberries on the Atari added to the action. And Pacman appeared in the Bugs cartoon!





THE BUGS ARE ENTERING THEIR NEW MICRO...

AHEM!  
WE PROMISE!

YOU MAY ONLY ENTER IF YOU PROMISE NOT TO CORRUPT, PERVERT OR IMPAIR ANY PROGRAMS FOUND WITHIN



YES! IT WAS AN AWFUL PROGRAM. BUT WE KNOCKED IT INTO SHAPE FOR HIM. IT WORKS OUT TRAVEL COSTS, SUBSISTENCE, TOUR COSTS, TAKES INTO ACCOUNT HIS SALARY AND OF COURSE THE RUN FACTOR!



SHE CAN'T BE THAT BAD. I'LL GET GRAPHIC MODE TO DRAW HER UP!

YOU'VE GOT TO DO SOMETHING. THE PROGRAM IS BOUND TO COME UP WITH AUNT MAISIES... SHE'S SO CHEAP!



SOB! PLEASE ALTER THE PROGRAM. WE CAN'T GO BACK THERE!

B.B. BUT- THAT WOULD BE TAMPERING!

A FEW MOMENTS LATER...

HANG GLIDING IN NEARSDEN GREAT! I NEVER THOUGHT I COULD AFFORD IT!

HEE! HEE!



I CAN'T ITS DEAD AGAINST THE USER FRIENDLY CHARTER FOR BUGS! RULE 7. SECTION 8.



# Chameleon Computer Games For SPECTRUM

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## Everything for the Acorn and BBC microcomputer user. ACORN USER EXHIBITION Cunard International Hotel

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C&V 26

## BY ALLAN SCARFF

Go is far more popular in Japan than any comparable game is in the West. Apart from appearing on peak time television, Go is the subject of regular newspaper columns and the national press spend quite large sums of money on sponsoring professional Go tournaments.

In Japan, Tsume-Go takes the place of the daily newspaper crossword puzzle. This type of life and death Go problem can be extremely tricky to solve even though there may be very few moves to consider.

The example shown in figure 1 is as about as simple as they come. Black's first move is almost certainly at A3, B3, A4 or B4, but which?

The object is to stop white forming two eyes. If, for instance, white manages to play both at A3 and B3, white's stones can never be reduced to a single liberty and therefore can never be captured.

Figure 2 shows black's most obvious approach which of course fails!

If you wish to get the full flavour of Tsume-Go try to solve the problem without looking at figures 4 and 5. Even though there are only a few possibilities you may soon find that it becomes increasingly difficult to remember which sequences of moves you have already considered and thus what possibilities are left.

This is one element of Go in which the computer can shine. Since the position is entirely isolated, there are no complex interactions to complicate matters. The simple technique of tree-searching will suffice.

Figure 3 shows a small part of the tree of possible sequences. After each move the white stones must be examined for one of three states:

- Dead — there are no longer two or more potential eyes



Figure 1: Black to play and kill white (crosses mark potential eyes)



Figure 2: The obvious failure (two eyes are alive)

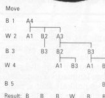


Figure 3: A small portion of the tree.



Figure 4: A less obvious failure. (The second eye is achieved after capture of three black stones).



Figure 5: Success! (If white next plays at B4 black captures at B3).

- Alive — there are two or more completely formed eyes

- Maybe either — there are still potentially two eyes not yet fully formed.

In the last case the next move in the sequence must be tried. In the other two cases alternative moves must be examined.

The listing shown gives the main logic needed to search the tree.

We need only consider the intersections within the enclosing black stones. The x and y co-ordinates of these points must be placed in the tryx and tryy arrays prior to calling the tsume procedure. The routine finishes with the result, the first black move, available via the number 1 element of the branch array.

For a problem of this size the procedure will examine about 200 sequences averaging under 5 moves each. Since the status of the white stones must be examined after each move, the whole process will take many seconds if not minutes.

Larger, more typical problems can take much longer. It may be possible to speed the search up by eliminating some of the sillier moves, but too heavy pruning of the tree can mean rejecting a move that may look silly but is actually the only move that works!

Now if you've attempted the example (without the aid of a computer), you may appreciate the worth of a thorough Tsume-Go program even if you have to leave it running all night!

```
1000 REM BBC BASIC
1010 REM Tsume PROCEDURE
1020 REM tryx and tryy must already hold coordinates
1030 REM branch array must already be defined
1040 REM Decision Tables:
1050 REM      WHITE MOVE      BLACK MOVE
1060 REM -----
1070 REM      next selection : up 1 branch
1080 REM      next selection : up 1 branch : not applicable
1090 REM      alive : up 1 branch : down 1 branch
1100 REM      maybe : down 1 branch : up 2 branches
1110 REM      branch exhausted : up 2 branches : up 2 branches
1120 REM -----
1130 REM
1140 DEF PROCtsume(limit)
1150 move=1 : branch(1)=1 : REM initialise
1160 IF move > 0 select=branch(move) : PROCredoes(move)
```

```
1170 IF move < 1 ENDPROC
1180 REPEAT
1190   legal=FUNColegal(move(tryx(select),tryy(select)))
1200   select=select+1
1210 UNTIL legal OR select=limit
1220 IF NOT legal move=move+2 : GOTO 1160 : REM up 2 branches
1230 REM legal:-
1240 PROCtestlife
1250 IF maybe move=move+1 : select=1 : GOTO 1180 : REM down
1260 IF (dead) AND (move=move+2) GOTO 1180 : REM across
1270 REM all other legal cases:-
1280 move=move+1 : GOTO 1160 : REM up 1 branch
1290 REM
1300 REM This routine is written for simplicity! For space saving
1310 REM use byte arrays accessed via indirection operators. For
1320 REM elegance use block structure (no GOTO's) with recursion
1340 REM (the routine calling itself).
```

There is still only a limited library of games software for the Dragon owner. And many have looked longingly at the wealth of Tandy Colour Computer software and wished the two machines were closer than the hair's breath which separates them.

Now they are. RON POTKIN has taken time off from his Warpath series to show Dragon owners how they can make use of Colour Computer software on their brand new machines.

If you own a Dragon, you probably know that it is similar to the TRS-80 Colour Computer. The Basic commands are the same and it uses the same machine language. Yet despite this, it is unlikely that a program written for the TRS-80 will run satisfactorily on the Dragon. In this article, I intend to give some help in converting the programs so that they will run.

Unfortunately the PLAY command still defies translation, but I never use it anyway.

Unfortunately, little can be done to ROM packs. The design is such that they cannot be easily be altered to run on the Dragon. We can however, adjust Basic programs. Machine language programs (those which are run using the EXEC command) can also be altered but this can be very difficult. More about this later.

First, let us examine the Basic Interpreter Program. You will know that when you switch on the computer, it wakes up and prints "OK" on the screen. In that fraction of a second an initialisation program, a part of the Basic Interpreter, has been automatically run in order that the computer may be ready to accept and carry out your commands.

This is similar to a calculator which is able to add, subtract, multiply and so on immediately you turn it on.

It is a complex program. There are routines to print on the screen, read the keys you press at the keyboard, draw a line, read the tape and many more. Many programmers when writing in machine language

## TIME AND SPACE

will use these routines in their programs.

It saves time and space and avoids re-inventing the wheel, but it is one of the main reasons for our conversion problem. You must know where these routines lie in memory and the addresses may be different in the two machines.

The Basic Interpreter cannot be erased or changed. When you switch the computer off,

any program you have entered will be lost but the Interpreter remains intact, ready to spring into action when you next turn it on.

One function of the Interpreter is to reduce the length of a Basic line. Let me explain what this means. Assume I type in the following line:  
10PMODE 4,1:PCLS:SCREEN  
1,0

## LISTING GARBAGE

Ignoring the line number and spaces, this has 23 characters but to save space the commands PMODE, PCLS and SCREEN are converted to numbers (or tokens) so that instead of 23 characters only 11 are required to hold the line in memory.

These tokens are not the same in both machines. As a result, if you load a TRS-80 program in this compressed format into the Dragon, the instructions will be mis-read. When you list the program, you may believe that you are listing "garbage", but closer inspection will show that although the Basic commands are different the line numbers and variable are intact.

It is usual to save the program on tape in compressed format because it reduces loading time, but you do have the option of saving in ASCII format. The command is: CSAVE "PROGRAM".A

Saved this way, the words PMODE, PCLS and SCREEN will be saved instead of the tokens. If you save a program on tape in the ASCII format using the TRS-80, you will be able to load it correctly into the Dragon. The Dragon will read the commands and translate them into its own tokens. Try this method if you have access to a TRS-80.

Although we can change the tokens, there is one instruction which may cause difficulties. This is the USR function which is used to access a machine language program from Basic. It is mentioned only very briefly in the Dragon manual.

If Basic passes a number to the program or the program

# DRAGON FROM THE

passes a number back to Basic, two addresses within the Interpreter must be changed in the machine language. These addresses are:

	TRS-80	Dragon
Get argument from Basic	46061	B3ED 8B30
Return result to Basic	46324	B4F4 35895 8C37

In addition, it may be necessary to check whether routines in the Interpreter have been used. This starts to get complicated and there are no easy rules. You will soon discover that trying to understand a program written in machine code is a challenge. If you are keen, get a disassembler and be prepared for some late nights!

The TRS-80's EDTASM has a good disassembler but you cannot use the tape commands. If you find this difficult

to follow, don't worry; your understanding will improve as you become more accustomed to your Dragon. Just remember that if you do not think you can

convert a TRS-80 program, don't waste your money!

Now let's see how the program can help. It's purpose is to create a machine language program which will convert the TRS-80 Basic tokens to the equivalent for the Dragon. It will leave unchanged anything contained within strings, so that any machine language routines or graphics will be safe. The program syntax is not checked.

All lines within the TRS-80 program containing USR will

## LOADER FOR DRAGON CONVERTER

```

10 CLEAR10,29999
30 DATA 80,81,82,83,84,85,86,87
  ,88,89,90,91,92,93,94,95,96,97
  ,98,99,100,101,102,103,104,105
40 DATA 91,92,93,94,95,96,97,99
  ,98,99,100,101,102,103,104,105
50 DATA A2,A3,A4,A5,A6,A7,A8
  ,C0,C1,C2,C3,C4,C5,C6,C7
60 DATA C8,C9,CA,CB,CC,CD,CE,CF
  ,A9,98,9E,AA,AB,AC,AD,AE
70 DATA AF,B0,B1,B2,B3,B4,B5,B6
  ,B7,B8,B9,BA,BB,BC,BD,BE,BF
80 DATA B2,B1,B4,BB,BC,BD,BE,BF
  ,90,91,92,93,96,97,98,99
90 DATA 9A,9B,9C,9D,9E,9F,A0
  ,83,85,95,9C,9D,9E,9F,A0
100 DATA 80,81,AA,8E,80,19,7F,7D
  ,76,18,AE,81,34,20,19,AE
110 DATA 81,18,6F,70,71,AA,8A,81
  ,22,26,AA,C6,81,F8,7D,78
120 DATA F7,7D,70,24,AA,81,00,27
  ,44,F6,7D,70,C1,06,26,39
130 DATA 81,F7,26,27,30,81,E6,84
  ,C1,80,25,2D,C4,C5,18,8E
140 DATA 7D,AE,E6,AE,E7,84,C1,A1
  ,26,1F,B6,7D,ED,AD,9F,A0
150 DATA 82,80,25,86,29,AD,9F,A0
  ,82,28,8E,81,82,25,8A,80
160 DATA 80,10,8E,7D,80,AA,A6,A7
  ,84,30,81,2D,80,39,81,66
170 DATA 84,81,00,27,85,35,18,16
  ,FF,8C,30,10,3F,55,27,10
180 DATA 83,EB,00,64,80,8A,00,81
  ,34,16,FC,70,71,8E,7D,EE
190 DATA 80,10,80,2A,38,02,8D,17
  ,80,24,38,82,80,11,80,1E
200 DATA 38,82,80,86,80,10,38,82
  ,80,85,80,12,35,16,39,18
210 DATA 8E,80,80,83,84,25,84,31
  ,21,20,FB,C8,84,39,34,16
220 DATA 1F,28,1F,98,88,38,AD,9F
  ,A0,82,35,16,39
230 DATA XX
240 USR32000
292 CT=0
300 READA4:IFA4="XX"THEN500
310 FORUL,WAL("BX"AA)
315 CT=CT+WAL("BX"AA)
320 U=U+1
330 GOT0300
500 IFCT<36454 OR U<32317 THEN
  PRINT"ERROR- CHECK THE DATA!"EN
  D
510 PRINT"ACHINE CODE LOADED AT
  32000"
520 PRINT"OTOR IS ON:"OTORON
530 PRINT"READY RECORDER AND PRE
  SS ENTER"
550 INPUT04:OTOROFF
555 FORI=1T04
560 CSAVE"DRAGON",32000,32316,3
  2115
565 FORJ=1T02800:NEXTJ,I
570 PRINT"OK - EXECUTION ADDRESS
  IS 32115"
580 END

```

# NEW GAMES THE TANDY

be printed. If none is printed the converted program should run correctly. Otherwise, you will have to assess the difficulties bearing in mind the explanation above.

#### PREPARING THE PROGRAM

1. Type in the program below and save it on a new tape i.e. CSAVE "DRAGON"

2. Now type "RUN". The program will build up the machine language program.

3. There are two checks to ensure that the DATA has been entered correctly. If the number of items is not 316 or they do not sum to 36454, an error message will be printed. If this occurs inspect the DATA very carefully.

4. If the program passes the tests, you will be asked to get the cassette recorder ready. Put a second new tape into the recorder and press the RECORD and PLAY. Press ENTER when ready. Don't use the same tape — things can get very difficult if you want to erase one program and not the other.

5. The converter will save in machine format. The name of the program is "DRAGON". Four copies are saved.

#### OPERATION

1. Switch on the Dragon and type "CLEAR 200,31999". This will keep the routine safe.

2. Rewind the tape containing the machine program and load it i.e. CLOADM "DRAGON".

3. Now load the TRS-80 program written in Basic.

4. Type "EXEC 32115".

5. The program will print out line numbers of any USRs.

6. When conversion is complete, LIST the program. It should now make sense.

7. CSAVE the converted program on a new tape.

8. Do not RUN it if you have further programs to convert since programs using protected memory are liable to ruin the converter.

9. Check the programs and the USRs once all conversions are complete.

By the way, the program does not work in reverse! You cannot convert a Dragon program back to the TRS-80.



Illustration: Dorian Cross



## LEARN THE PHAROAH'S SECRETS

### TIPS ON TUTANKHAM

Tutankham has a natural appeal to the watcher but it is a confusing game for the beginner as he struggles to find his way through the maze of tunnels to the legendary treasure of the tombs.

It's a maze game with a difference as you can't see the whole maze at once, just a collection of rushing bats, snakes and birds, the undead creatures of the pharaoh's tomb, whose touch is lethal.

These have to be shot, smart-bombed or dodged as you grab the treasures and keys necessary to progress.

You begin your expedition with two smart bombs and three men and one extra of each arrives

every 20,000 points. Smart bombs are shown as lanterns at the top of the screen and clear the whole area you are in at the time.

The first screen takes you up past the enemy's house where monsters issue forth and into a secret tunnel through to the second screen.

The tunnel is only opened by the key which must first be grabbed by the adventurer. 1,000 points are awarded for getting the key and there is a time bonus to be scored by getting it into the lock soon after the start of that screen.

If you run out of time then your fire power vanishes and you have to get to the lock before the enemy get to you.

The second — and all subsequent screens — need two keys for two locks, collected in the order: key, lock, key, lock.

Your fire ability is fast and stabs out both ahead and behind you at the same time. But it is limited, it can't be used in vertical passages. The monsters realise this and rush you in the vertical passages while lurking and waiting in the horizontal ones.

These adversaries often have their little dens situated on main highways through the maze and challenge you to get past.

The maze is set out as underground tunnels with large open spaces, supposedly giving the effect of the passages you might find beneath a pyramid.

The open spaces can be particularly dangerous when the creatures can attack from all sides.

For bonus points pick up the treasures, either a chest or a ring, that are dotted around the screen. The first of these is worth 500 points, the next 1,000, the next 1,500 and so on.

Smart bombs are often best saved for the rush to the last lock, when monster activity is at its height. If in doubt check the radar scanner at the top of the screen.

Getting past a den is a case of waiting until a spurt of monsters dies down and then rushing, guns blazing past.

The snakes and birds are predictable but bats are fast and erratic. If something closes its jaws around you as you approach your run-in to the final treasure, you can usually be sure its one of these.

Our thanks to Carl Warrington of Leicester for the tips.



## POINTS FOR CRASHING

### BURNING RUBBER

Burning Rubber is the first car race game which encourages you to slam into other road-users.

Simulating the stock car races where the aim is to crunch as many opponents as possible, Burning Rubber gives points for bumping into rivals and sending them spinning from the track.

The danger is that each contact will also send your own car screeching towards the track perimeter, so that you must leave yourself room to control the swerve before hitting the hedge boundary.

Burning Rubber is a racetrack which is looked down on from above, it travels in a straight line scrolling down from the top of the screen.

Unfortunately the course seems to be set in a river delta and the track is constantly being interrupted by stretches of water. These sometimes have narrow bridges across their depths, other times the track

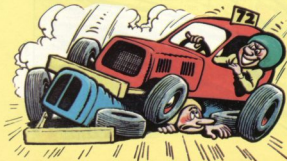
continues on islands in the centre of the waterways.

Luckily a jump button will lift you out of trouble and actually help boost the score if you can successfully manage to land on an unsuspecting opponent.

The only restriction on jumping is that you must be up to a certain speed before you can take off. That speed is achieved quite easily and then there is nothing to stop you leapfrogging around the track, over opponents, rivers and intruding hedges.

Nothing, that is, except a tendency to slow down drastically when landing on an opponent and a certainty that a watery death awaits anyone landing in the drink.

Other hazards come mainly from your fellow road users. These vary from hole-digging trucks, to almost unmovable caterpillar tread trucks.



## SEND YOUR BEST SHOT

Hurry up and send in a top score, if you want to enter our 1983 Video Games Championships.

The grand final takes place at the end of June and we'll need your top score in by June 23rd to make you eligible to win a place at the finals.

A form can be cut out of the magazine on page 11 and taken around to your local pub, club or arcade to fill in the best score you can on your favourite machine.

You can enter on up to three different machines. The prize is a brand new arcade game from

Taitel Electronics, one of their new summer releases which will be in the winner's home before it's in the arcades.

And if you make your top score while your magazine is still at home ask the arcade owner if he has an entry form. We are distributing forms to many arcade, pub and college sites.

If you have entered already there's nothing to stop you improving your score in the meantime and sending it in on this month's form but please ensure that every entry is witnessed by the pub, club or arcade owner.





So you think that all pinball machines look the same eh? Just a playfield and a sit-up-and-beg backslap. Well, have we got news for you! The world is that Williams are bringing out a pin that could revolutionise the image of the pin table forever. Well, until the next revolution anyway!

Based on the Williams video game called Joust — which features flying beasts and gallant knights — the company's new pin can be played by two players. So what's new about that, I hear you ask. But they play both at the same time — ever seen that before smarty!

Yes, Joust — the pinball, can be played by two players at opposite ends of the table one is the attacker, the other the defender. Roles reverse when the ball is lost.

Meanwhile back to the more conventional side of the pinball market and Zaccaria have a new pin called Time Machine.

The special feature on this machine goes into action when you get the ball into a saucer about two-thirds of the way up on the left hand side of the playfield. Then the three pop-bumpers disappear into the bowels of the machine and a flat surface takes its place. This takes you into the "past". When the bumpers are up it's the "future".

This feature makes Time Machine two games in one.

## ALIENS TAKE A TUMBLE

For Scramble and Zaxxon fans who enjoy a good battle over scrolling scenery, Xevious holds new graphical and action thrills.

The story is set in Earth's future with the massive Xevious fleet gradually taking control of the world we humans know as home.

In true *Boys' Own* style, a hero is despatched to strike deep into the Xevions' home territory and destroy their mothership.

Xevious forces are to be found on the ground and in the air. Bombing and firing away as he did in Zaxxon, but this time from a different angle and viewpoint the player takes on one batch of Xevions after another. Each wave gets progressively difficult.



That legendary bird of fortune, the Roc, takes the place of Donkey Kong's starlet in a new game, Roc n' Rope.

The Roc is every bit as elusive to capture as Kong's starlet was to save and like her, it leaves hints to its whereabouts strewn around the vicinity in the shape of golden feathers.

Mario's place is taken by an intrepid explorer who is betting on new technology to take him past the horrors and dangers of the primeval labyrinth of caves, trees and terraces.

Whether or not his bet is well-founded, depends on you as you guide his progress to the Roc at the top of the screen. The first screen is laid out with rock ledges. You climb with the aid of a rocket gun which has a rope attached to its pointed tip. As it imbeds itself in the next level, you anchor the far end and begin your ascent. Cavemen and dinosaurs are out to stop you but you

### XEVIOUS

A crosshair sight preceding his craft helps the player judge his range.

If it all sounds too familiar, the difference Xevious boasts is in a detailed and varied backdrop to the action and some marvellous effects from the opposing fleet as they roll, tumble or zoom in towards you.

My own favourites are the turning mirrors which spin slowly as you approach them.

The Mothership also puts on an almighty barrage to prevent you placing your ranging site over its vulnerable core.

Rivers, roads, forests and airstrips form the backdrop to the action. Operators are given a lot of leeway over how difficult Xevious can be for the beginner, so if you find it too hard or too easy have a word in the arcade owner's ear.

## A LONG HAUL AFTER AN EXOTIC BIRD

### ROC N' ROPE

are equipped with a flash which can be used to blind them.

Cavemen are quite capable of following you up a rope or shaking you down from it, but flash blindness renders both they and the dinosaurs helpless for a while.

The cave-dwellers can change levels by climbing up or down vines and are difficult to shake off your trail. Points are gained for picking up golden feathers and if the player finds a golden egg he will become super-powered and invincible for a while, destroying his enemies at a touch.

Rock stairways, fountains and a prehistoric revolving door type escalator, feature in the later screens but the dinosaurs and cavemen are to be found on every one.

Like most of the Kong-type games, the successful players will memorise a good route and follow it to the top again.



## DON'T LET THEM BREAK YOUR CHAIN

### DOMINO MAN

Remember lining up a snake of dominoes and sending it sprawling with a careless flick of your little finger at one end or another.

Well domino flicking is big business in the States at the moment with teams trying to produce new record flicks and ever more impressive displays.

The trend is recreated in Domino Man where you take the title role and set up dominoes in a chain behind the supermar.

Dominoes are set up merely by touching them but you have to do it before an old lady with a bag, a bully, or a little boy knocks part of your chain over. You can knock them out of the way. Then there's this bee which wanders around so slowly that you may feel tempted to go and find out what it's doing on screen — don't, it stings!

After conquering the super-market you can move onto the golf course, where a small dog threatens domino destruction or onto the construction site.

You can trap certain of your enemies in the domino chain for extra points and other bonuses can be achieved by finishing your screen in a good time.

The dominoes are laid out in easy to assemble chain and tactics usually centre on whether you go for a whole chain at once or shorter chains which are easy to rebuild if knocked over.

Illustrations: Terry Rogers



Howdy partners. My name is Killer McGrew and this here's my gang, The Ringo Kid — he's the one with the ring through his nose — and Sid Lightning — so called because of the ragged scar on his cheek.

A couple of the nicest guys you're ever likely to come across in this here town. Unless of course they don't like the way you look. Then they can get quite nasty. That's why it's just as well to pack a mean six-shooter and be very quick on the draw!

This here game will give you a bit of practice, just in case you come up against an 'ornery old gunfighter in the street one fine day.

This program uses both hi-res pages on the Apple and is just under 6k in length. Therefore it is a very tight fit below hi-res page 1 and so there are no REM statements in the program and the line numbering is fairly crucial.



Illustrations: Terry Rogers

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**DEAD OR ALIVE**



BY ROBERT PENROSE

# QUICKDRAW

RUNS ON AN APPLE IN 6K

```

1 GOTO 47
2 FOR I = 40 TO 1 STEP - 1: POKE PIT,I: POKE DUR,5: CALL NOISE: CALL NOIS
E: NEXT I: RETURN
3 FOR J = 1 TO 2000: NEXT I: RETURN
4 HOME: VTA8 21: HTAB 1: RETURN
5 POKE 790,255:OP# = "KILLER MCGREW": RETURN
6 POKE 790,200:OP# = "THE RINGO KID": RETURN
7 POKE 790,150:OP# = "SID LIGHTNING": RETURN
8 X = 200:Y = 130:SHOTS = 0:SC = 0
9 POKE - 16368,0: PRINT "WHEN YOU SEE THE GLASS - FIRE!!": GOSUB 3: POKE
- 16302,0: GOSUB 3: GOSUB 4
10 IF PEEK ( - 16384) > 127 THEN GOSUB 2: POKE - 16301,0: PRINT "OUCH!!
YOU JUST SHOT YOUR FOOT!!": GOSUB 3:SHOTS = SHOTS + 1: GOTO 19
11 POKE 230,32: SCALE= 1: ROT= 0: XDRAW 5 AT X,Y: CALL 791: CALL 791: XDR
W 5 AT X,Y
12 IF PEEK ( - 16384) > 127 THEN GOTO 15
13 POKE - 16299,0: GOSUB 2: GOSUB 3: GOSUB 3: POKE - 16300,0: POKE - 16
301,0: GOSUB 4: IF PEEK ( - 16384) > 127 THEN PRINT "NOT QUICK ENOUGH!!":S
HOTS = SHOTS + 1: GOSUB 3: GOTO 19
14 PRINT "COME ON! YOU ARE SUPPOSED TO SHOOT!!": PRINT "I AM NOT PLAYING BY
MYSELF!": GOSUB 3: GOSUB 3: GOTO 19
15 POKE - 16299,0: GOSUB 2: POKE 230,64
16 POKE PIT,120: POKE DUR,100: CALL NOISE
17 FOR I = 0 TO 48 STEP 8: ROT= I: SCALE= I / 8 + 1: XDRAW 6 AT X,Y: FOR J
= 1 TO 10: NEXT I: XDRAW 6 AT X,Y: NEXT I: GOSUB 3
18 SHOTS = SHOTS + 1:SC = SC + 1: POKE - 16300,0: POKE - 16301,0
19 GOSUB 4: PRINT SC:" OUT OF ":SHOTS
20 IF SHOTS = 6 THEN POKE - 16368,0: GOTO 72
21 GOSUB 3: GOSUB 4: GOTO 9
22 FOR I = 791 TO 797: READ J: POKE I,J: NEXT
23 DATA 173,22,3,32,168,252,96
24 RETURN
25 HPLLOT 220,100 TO 75,100 TO 75,80 TO 200,80 TO 200,100: HPLLOT 150,65 TO
200,65: HPLLOT 0,141 TO 270,141
26 HPLLOT 100,50 TO 100,40 TO 105,30 TO 145,30 TO 150,40 TO 150,50 TO 145,6
0 TO 105,60 TO 100,50: HPLLOT 105,50 TO 105,40 TO 110,35 TO 140,35 TO 145,40
TO 145,50 TO 140,55 TO 110,55 TO 105,50
27 HPLLOT 95,68 TO 105,68: HPLLOT 99,66 TO 101,66 TO 102,68 TO 102,70 TO 101
,72 TO 99,72 TO 98,70 TO 98,68 TO 99,66: HPLLOT 99,69: HPLLOT 101,69: HPLLOT 9
9,71 TO 101,71
28 HPLLOT 93,80 TO 93,75 TO 96,72 TO 104,72 TO 107,75 TO 107,80: HPLLOT 106,
80 TO 106,76 TO 104,74 TO 104,80: HPLLOT 94,80 TO 94,76 TO 96,74 TO 96,80: H
PLLOT 96,78 TO 97,78 TO 97,72: HPLLOT 98,72 TO 98,78 TO 102,78 TO 102,72: HPL
LOT 103,72 TO 103,78 TO 104,78
29 RETURN
30 HPLLOT X,Y TO X,Y - 6 TO X + 2,Y - 8 TO X + 2,Y - 10 TO X + 3,Y - 10 TO
X + 3,Y - 8 TO X + 5,Y - 6 TO X + 5,Y TO X,Y: HPLLOT X,Y - 6 TO X + 5,Y - 6:
HPLLOT X,Y - 3 TO X + 5,Y - 3: RETURN
31 FOR I = 770 TO 789: READ J: POKE I,J: NEXT I: REM SOUND
32 DATA 172,1,3,174,0,3,173,48,192,202,224,0,208,251,136,192,0,208,240,96
33 RETURN
34 FOR I = 24577 TO 24926: READ J: POKE I,J: NEXT
35 DATA 6,0,14,0,87,0,163,0,241,0,63,1,88,1,118,115,94,187,118,115,115,1
15,107,107,107,115,115,123,99,123,123,115,115,118,115,118,115,115,107,107,1
07,227,103,99,99,99,99,107,67,99,99,99,227,99,99,99,107,115,115,115,107,99,
99,99,99,99,227
36 DATA 76,99,99,99,99,99,99,227,191,246,91,107,107,107,107,107,107,109,91,
88,0
37 DATA 118,243,78,171,118,115,115,115,123,123,123,115,115,107,99,107,107,
115,243,118,243,118,115,115,123,123,123,99,101,99,99,99,99,123,67,99,99,99,
99,97,99,99,123,115,115,115,123,99,99,99,99,99,99
38 DATA 92,99,99,99,99,99,99,173,118,73,123,123,123,123,123,123,123,123,12
3,123,123,91,88,0
39 DATA 118,115,94,187,118,115,115,107,107,107,115,115,123,99,123,123,115
,115,118,115,118,115,107,107,107,227,103,99,99,99,99,99,100,99,107,107
,67,107,67,107,120
40 DATA 123,187,87,123,99,123,123,67,107,107,99,99,227,76,99,99,99,99,99,

```

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```

227,191,246,91,107,107,107,107,107,107,107,107,107,91,88,0
41 DATA 118,243,78,171,118,115,115,123,123,123,115,115,107,99,107,107,115,
243,118,243,118,115,115,123,123,123,99,101,99,99,99,99,227,100,99,123,123,6
7,123,67,251,104
42 DATA 107,171,85,107,99,107,107,67,123,123,99,99, 99,92,99,99,99,99,99
, 99,173,118,73,123,123,123,123,123,123,123,123,123,91,88,0
43 DATA 100,123,123,123,115,115,115,115,115,107,107,107,99,99,99,99,107,1
07,115,115,123,123,91,88,0
44 DATA 176,92,107,95,88,0
45 POKE 232,1: POKE 233,96
46 RETURN
47 N = 1:HC = 3:PIT = 768:DUR = 769:NOISE = 770: HGR : HGR2
48 TEXT : HOME : VTAB 10: HTAB 15: INVERSE : PRINT "QUICKDRAW": GOSUB 22:
GOSUB 31
49 POKE PIT,140: POKE DUR,50: CALL NOISE: FOR I = 40 TO 1 STEP - 1: POKE
PIT,I: POKE DUR,20: CALL NOISE: CALL NOISE: NEXT
50 VTAB 15: HTAB 8: PRINT "FASTEST GUN IN THE WEST": NORMAL
51 FOR I = 32 TO 64 STEP 32: POKE 230,I: HCOLOR= HC: GOSUB 25
52 Y = 65: FOR X = 155 TO 185 STEP 10: GOSUB 30: NEXT
53 NEXT
54 GOSUB 34
55 ROT= 0: SCALE= 1
56 POKE 230,32: XDRAW 1 AT 10,120: XDRAW 5 AT 112,76
57 POKE 230,64: XDRAW 3 AT 10,120: XDRAW 5 AT 112,76
58 VTAB 20: HTAB 11: PRINT "SPACE BAR TO FIRE": GOSUB 3
59 POKE - 16304,0: POKE - 16301,0: POKE - 16300,0
60 VTAB 21: PRINT "WHAT DO YOU CALL YOURSELF?"
61 VTAB 23: INPUT "":N$
62 GOSUB 4: PRINT "WELL "":N$: PRINT "LET'S PRACTICE YOUR DRAW"
63 GOSUB 3: POKE - 16302,0: GOSUB 3
64 FOR I = 1 TO 4: POKE - 16299,0: FOR J = 1 TO 1500: NEXT : POKE - 1630
0,0: FOR J = 1 TO 500: NEXT : NEXT
65 POKE - 16301,0
66 GOSUB 4: PRINT "THAT'S ENOUGH! "":N$: PRINT "WE DON'T WANT YOU TO STRAIN
SOMETHING!"
67 GOSUB 3: GOSUB 3: GOSUB 4
68 PRINT "LET'S SHOOT AT SOME GLASSES": PRINT "DON'T SHOOT TOO SOON": PRIN
T "OR YOU'LL BLOW YOUR FOOT OFF!!"
69 GOSUB 3
70 ON N GOSUB 5,6,7
71 GOSUB 3: GOSUB 4: GOTO 8
72 ROT= 0: SCALE= 1: GOSUB 3: GOSUB 4: IF SC > 2 THEN 76
73 PRINT "DREADFUL!": PRINT "WANT TO QUIT? (Y/N) "": INPUT "":Z$: IF Z$ =
"N" THEN GOSUB 4: GOTO 8
74 GOSUB 4: PRINT "THAT MIGHT NOT BE POSSIBLE!": IF RND (1) > .5 THEN 78
75 GOSUB 3: TEXT : HOME : PRINT "O.K. QUIT WHILE THE GOING'S GOOD. BYE!":
END
76 IF SC > 4 THEN 78
77 PRINT "YOU WON'T SURVIVE AGAINST "":OP$: PRINT "GO BACK AND PRACTICE AGA
IN!": GOSUB 3: GOSUB 3: GOSUB 4: GOTO 8
78 PRINT "OH! OH! HERE COMES "":OP$
79 X1 = 260:X2 = 262:Y = 120: POKE 230,64: XDRAW 3 AT 10,120: XDRAW 1 AT 10
,120: XDRAW 2 AT X2,Y: GOSUB 3
80 POKE 230,32: XDRAW 2 AT X1,Y: POKE - 16302,0
81 POKE 230,64: XDRAW 2 AT X2,Y:X2 = X2 - 4: XDRAW 2 AT X2,Y: POKE - 1629
9,0
82 POKE 230,32: XDRAW 2 AT X1,Y:X1 = X1 - 4: XDRAW 2 AT X1,Y: POKE - 1630
0,0
83 IF X1 < > 200 THEN 81
84 POKE 230,64: XDRAW 1 AT 10,120: XDRAW 3 AT 10,120: XDRAW 2 AT 202,120:
XDRAW 4 AT 200,120
85 POKE - 16301,0: POKE 230,32
86 GOSUB 4: PRINT "WHEN THE GLASS SMASHES ON THE FLOOR": PRINT : PRINT "FI
RE!!"
87 GOSUB 3: FOR I = 64 TO 32 STEP - 32: POKE 230,I: XDRAW 5 AT 112,76: NE
XT
88 Y = 76: FOR I = 112 TO 208 STEP 3: XDRAW 5 AT I,Y: FOR J = 1 TO 50: NEXT

```

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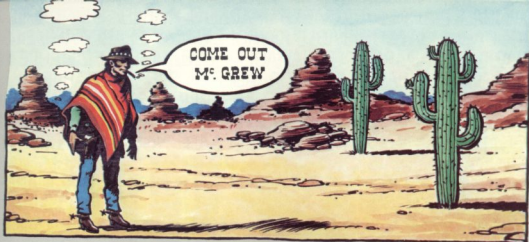
Mail to: SOFTWARE EXPRESS FREEPOST (no stamp required)  
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```

: XDRAW 5 AT I,Y: NEXT
89 X = I: FOR I = Y TO 96 STEP 3: XDRAW 5 AT X,I: FOR J = 1 TO 50: NEXT : X
DRAW 5 AT X,I: NEXT
90 POKE - 16368,0
91 POKE PIT,100: POKE DUR,50: CALL NOISE
92 CALL 791
93 IF PEEK ( - 16384) > 127 THEN 103
94 POKE - 16302,0: POKE - 16299,0: GOSUB 2
95 POKE 230,32: XDRAW 1 AT 10,120: ROT= 48: XDRAW 1 AT 10,138: ROT= 0: GOS
UB 4: POKE - 16300,0: POKE - 16301,0
96 PRINT "OH DEAR!": FOR J = 1 TO 1000: NEXT
97 FOR I = 0 TO 10: READ A,B,C: POKE PIT,A: POKE DUR,B: CALL NOISE: FOR J
= 1 TO C: NEXT : NEXT
98 DATA 250,255,200,250,255,200,250,80,100,250,255,200,220,255,200,250,80,
100,255,255,200,250,80,100,255,255,200,250,80,100,255,255,500
99 POKE - 16368,0
100 CALL - 912: PRINT "PLAY AGAIN ? ": GET Z#
101 IF Z# < > "Y" THEN TEXT : HOME : PRINT "BYE!": END
102 RESTORE : GOTO 47
103 POKE - 16368,0: POKE - 16302,0: POKE - 16299,0: GOSUB 2: GOSUB 3
104 POKE 230,32: XDRAW 2 AT 200,120: ROT= 16: XDRAW 2 AT 200,138: ROT= 0:
GOSUB 4: POKE - 16300,0
105 GOSUB 3: GOSUB 3
106 POKE 230,64: XDRAW 3 AT 10,120: XDRAW 1 AT 10,120: XDRAW 4 AT 200,120:
ROT= 16: XDRAW 2 AT 200,138: ROT= 0: XDRAW 2 AT 262,120
107 X1 = 260: X2 = 262: Y = 120: POKE 230,32: XDRAW 2 AT X1,Y
108 POKE 230,64: XDRAW 2 AT X2,Y: X2 = X2 - 4: XDRAW 2 AT X2,Y: POKE - 162
99,0
109 POKE 230,32: XDRAW 2 AT X1,Y: X1 = X1 - 4: XDRAW 2 AT X1,Y: POKE - 163
00,0
110 IF X1 < > 208 THEN 108
111 POKE 230,64: ROT= 16: XDRAW 2 AT 200,138: XDRAW 2 AT 202,138: Y1 = 138:
POKE - 16299,0
112 POKE 230,32: ROT= 0: XDRAW 2 AT X1,Y: ROT= 16: XDRAW 2 AT X1 - 8,Y1: X1
= X1 + 4: XDRAW 2 AT X1 - 8,Y1: ROT= 0: XDRAW 2 AT X1,Y: POKE - 16300,0
113 POKE 230,64: ROT= 0: XDRAW 2 AT X2,Y: ROT= 16: XDRAW 2 AT X2 - 8,Y1: X2
= X2 + 4: XDRAW 2 AT X2 - 8,Y1: ROT= 0: XDRAW 2 AT X2,Y: POKE - 16299,0
114 IF X2 < > 262 THEN 112
115 POKE 230,32: XDRAW 2 AT X1,Y: XDRAW 5 AT 112,76: ROT= 16: XDRAW 2 AT X
1 - 8,Y1: ROT= 0: POKE - 16300,0
116 POKE 230,64: XDRAW 1 AT 10,120: XDRAW 3 AT 10,120: XDRAW 2 AT X2,Y: XD
RAW 5 AT 112,76: ROT= 16: XDRAW 2 AT X2 - 8,Y1: ROT= 0
117 POKE - 16301,0: PRINT "YOU'RE STILL HERE!": PRINT "MORE PRACTICE NOW
YOUR FAMOUS!"
118 GOSUB 3: GOSUB 3
119 N = N + 1: IF N < > 4 THEN 70
120 GOSUB 4: PRINT "I'M AFRAID YOU'RE NOW TOO FAST!": PRINT "NO-ONE WILL C
HALLENGE YOU AGAIN!": PRINT "I'M OFF!": GOSUB 3: GOSUB 3: TEXT : HOME : PRI
NT "BYE!!!"

```

# GENIE



## GENIE

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# able



**LOWE**  
COMPUTERS

```

1000 CALL SCREEN(16):: CALL CLEAR
1010 CALL MAGNIFY(2):: RANDMIZE
1020 REM *****
1030 REM *****
1040 REM *****
1050 REM *****
1060 REM *****
1070 REM *****
1080 REM *****
1090 REM *****
1100 REM *****
1110 REM *****
1120 REM *****
1130 REM *****
1140 REM *****
1150 REM *****
1160 REM *****
1170 REM *****
1180 REM *****
1190 REM *****
1200 REM *****
1210 REM *****
1220 REM *****
1230 REM *****
1240 REM *****
1250 REM *****
1260 REM *****
1270 REM *****
1280 REM *****
1290 REM *****
1300 REM *****
1310 REM *****
1320 REM *****
1330 REM *****
1340 REM *****
1350 REM *****
1360 REM *****
1370 REM *****
1380 REM *****
1390 REM *****
1400 REM *****
1410 REM *****
1420 REM *****
1430 REM *****
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1480 REM *****
1490 REM *****
1500 REM *****
1510 REM *****
1520 REM *****
1530 REM *****
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1560 REM *****
1570 REM *****
1580 REM *****
1590 REM *****
1600 REM *****
1610 REM *****
1620 REM *****
1630 REM *****
1640 REM *****
1650 REM *****
1660 REM *****
1670 REM *****
1680 REM *****
1690 REM *****
1700 REM *****
1710 REM *****
1720 REM *****
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1760 REM *****
1770 REM *****
1780 REM *****
1790 REM *****
1800 REM *****
1810 REM *****
1820 REM *****
1830 REM *****
1840 REM *****
1850 REM *****
1860 REM *****
1870 REM *****
1880 REM *****
1890 REM *****
1900 REM *****
1910 REM *****
1920 REM *****
1930 REM *****
1940 REM *****
1950 REM *****
1960 REM *****
1970 REM *****
1980 REM *****
1990 REM *****
2000 REM *****

```

```

2010 CALL SCREEN(16):: CALL CLEAR
2020 CALL MAGNIFY(2):: RANDMIZE
2030 REM *****
2040 REM *****
2050 REM *****
2060 REM *****
2070 REM *****
2080 REM *****
2090 REM *****
2100 REM *****
2110 REM *****
2120 REM *****
2130 REM *****
2140 REM *****
2150 REM *****
2160 REM *****
2170 REM *****
2180 REM *****
2190 REM *****
2200 REM *****
2210 REM *****
2220 REM *****
2230 REM *****
2240 REM *****
2250 REM *****
2260 REM *****
2270 REM *****
2280 REM *****
2290 REM *****
2300 REM *****
2310 REM *****
2320 REM *****
2330 REM *****
2340 REM *****
2350 REM *****
2360 REM *****
2370 REM *****
2380 REM *****
2390 REM *****
2400 REM *****
2410 REM *****
2420 REM *****
2430 REM *****
2440 REM *****
2450 REM *****
2460 REM *****
2470 REM *****
2480 REM *****
2490 REM *****
2500 REM *****
2510 REM *****
2520 REM *****
2530 REM *****
2540 REM *****
2550 REM *****
2560 REM *****
2570 REM *****
2580 REM *****
2590 REM *****
2600 REM *****
2610 REM *****
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2670 REM *****
2680 REM *****
2690 REM *****
2700 REM *****
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2760 REM *****
2770 REM *****
2780 REM *****
2790 REM *****
2800 REM *****
2810 REM *****
2820 REM *****
2830 REM *****
2840 REM *****
2850 REM *****
2860 REM *****
2870 REM *****
2880 REM *****
2890 REM *****
2900 REM *****
2910 REM *****
2920 REM *****
2930 REM *****
2940 REM *****
2950 REM *****
2960 REM *****
2970 REM *****
2980 REM *****
2990 REM *****
3000 REM *****

```

# SUBSTRIKE

Your enemies under the waves run silent and run deep — waiting to catch you off guard and send you to a watery grave with a well aimed torpedo. Can you outwit these silent denizens of the deeps?

You are in command of a destroyer hunting for these deadly submarines. Once you pick up one on your radar screen the action starts. Simply line up your depth charges and blast away until you have

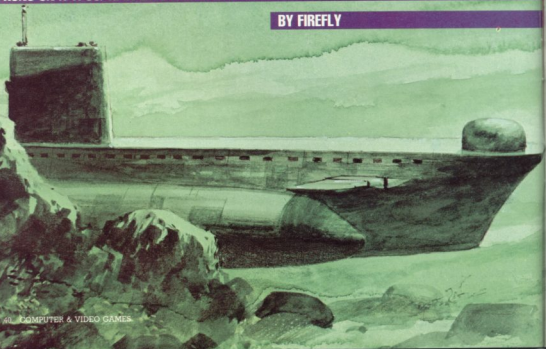
destroyed the enemy sub. If you miss the submarine will surface and fire at you — and there is no escape from the deadly missiles.

Each time you hit a sub you score points — and another metallic monster will appear under the waves.

You control your ship using the cursor keys 's' and 'd' and the 'f' key fires your depth charges.

**RUNS ON A TI 99/4a IN EXTENDED BASIC**

**BY FIREFLY**



```

800 X,GM=1 :: SD=SD-20
810 GOTO 380
820 REM *CHARGE HIT BOTTOM**
830 CALL POSITION(#3,Y,X):: CALL
840 DELSPRITE(#3)
845 CALL SPRITE(#4,115,12,183,X)
850 FOR A=1 TO 2
855 CALL PATTERN(#4,114):: CALL
860 COLOR(#4,RND*12+3)
865 CALL PATTERN(#4,115):: CALL
870 COLOR(#4,RND*12+3)
875 CALL PATTERN(#4,113):: CALL
880 COLOR(#4,RND*12+3)
885 CALL PATTERN(#4,113):: CALL
890 COLOR(#4,RND*12+3)
895 CALL SOUND(-500,-5,0)
900 NEXT A
910 G=0-S :: CALL POSITION(#2,A,
920 LOCATE(#2,G,B)
930 CALL POSITION(#2,Y,X)
940 IF Y<100 THEN 880
950 GM,X,S=0 :: SD=2000
960 GOTO 380
970 REM *HIT SUBMARINE**
980 CALL DELSPRITE(#3)
990 IF U=2 THEN CALL MOTION(#2,5
1000 ELSE CALL MOTION(#2,5,10)
1010 CALL SOUND(-200,-6,0):: CALL
1020 COLOR(#2,10)
1030 CALL POSITION(#2,A,B):: IF A
1040 THEN 720 ELSE 710
1050 CALL PATTERN(#2,113):: CALL
1060 COLOR(#2,12)
1070 CALL SOUND(-1000,-4,0)
1080 CALL SOUND(-1000,-6,0)
1090 CALL MOTION(#2,0,0)
1100 CALL POSITION(#2,Y,X):: CALL
1110 DELSPRITE(#2)
1120 FOR B=5 TO 10
1130 CALL SPRITE(#5,46,RND*2+9,Y,
1140 X,-10,SON(RND-.5)*20)
1150 NEXT B
1160 FOR DEL=1 TO 20 :: NEXT DEL
1170 CALL DELSPRITE(#0)
1180 NEXT 0
1190 SCORE=SCORE+1 :: DISPLAY AT(
1200 1) "SCORE",SCORE
1210 SPEED=SPEED+3
1220 GM,X,S=0 :: SD=3000
1230 GOTO 340
1240 REM *BOAT HIT**
1250 CALL MOTION(#1,0,0)

```

```

900 CALL POSITION(#1,C,D)
910 CALL POSITION(#2,A,B)
920 CALL SPRITE(#5,46,16,A,B)
930 U=C-A :: V=D-B :: OX=SGN(U)
940 OY=SGN(V) :: DX=D+OY :: DY=D-OY
950 IF N=ABS(U) :: N=ABS(V)
960 DZX=0 :: DZY=SGN(U) :: M=ABS(
970 V) :: N=ABS(U)
980 S=INT(M/2)
990 FOR I=0 TO M
1000 CALL LOCATE(#5,A,B)
1010 S=S+N :: IF S<M THEN 1020
1020 GOTO 1030
1030 A=A+DZX :: B=B+DZY
1040 FOR AS=1 TO 10
1050 CALL SOUND(200,-4,0,110,15,
1060 110,15,310,15)
1070 CALL PATTERN(#1,115)
1080 CALL COLOR(#1,RND*12+3)
1090 CALL SCREEN(RND*12+3)
1100 CALL COLOR(#1,RND*12+3)
1110 CALL PATTERN(#1,113):: CALL
1120 COLOR(#1,RND*12+3)
1130 CALL AS
1140 CALL SOUND(-1000,-5,0)
1150 CALL SCREEN(16)
1160 CALL POSITION(#1,Y,X):: CAL
1170 DELSPRITE(#1,85)
1180 FOR DEL=1 TO 500 :: NEXT DE
1190 CALL PATTERN(#1,97)
1200 CALL COLOR(#1,15)
1210 DISPLAY AT(10,7) "PLAY AGAI
1220 N? (Y/N)"
1230 CALL DELSPRITE(ALL)
1240 CALL KEY(0,K,S):: IF S=0 TH
1250 EN 1200
1260 IF K=88 OR K=121 THEN 1250
1270 CLEAR :: CALL DELSPRITE(ALL):: S
1280
1290 CALL SOUND(10,110,0)
1300 GOTO 1200
1310 X=0 :: GM=0 :: SCORE=0 :: S
1320 REED=7 :: SD=2000
1330 DISPLAY AT(1,1) "SCORE",SCO
1340
1350 CALL NCHAR(10,5,92,22)
1360 GOTO 320
1370 END

```

# The June Top Ten in Spectrum software at W.H.Smith.

The range of software available for the Sinclair Spectrum is to say the least, extensive.

So every month at W. H. Smith, we review the range with particular reference to presentation, challenge, excitement and value for money. And because we're quite severe it's a difficult job finally to arrive at a Top Ten. But as you can see, not impossible.

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Sinclair 48K **£7.95**



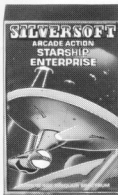
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Melbourne House 48K **£6.95**

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Space Intruders	Quicksilver	16	£4.95	
Time Gate	Quicksilver	48	£6.95	
Gulpman	Campbell	16	£4.95	
Spectral Invaders	Bug-Byte	16	£5.00	
Meteoroids	Softex	16	£4.95	
Planetoids	Sinclair	16	£4.95	
Hungry Horace	Sinclair	16	£5.95	
Space Raiders	Sinclair	16	£4.95	
Mazeman	Abersoft	16	£4.95	
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Ground Force Zero	Titan	16	£5.00	
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Leapfrog	CDS	16	£5.95	
Gobble-A-Ghost	CDS	16	£5.95	
Centi-Bug	DK Tronics	16	£4.95	
3D Tanx	DK Tronics	16	£4.95	
Cruising	Sunshine	16	£4.95	
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Jackpot	Computer Rentals	48	£4.95	
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Invasion Force	Artic	16	£4.95	
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Chess  
Sinclair  
48K **£7.95**



Starship Enterprise  
Silversoft  
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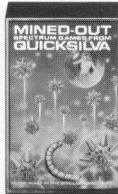
Horace Goes Skiing  
Sinclair  
16K **£5.95**



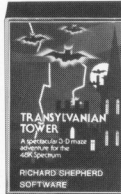
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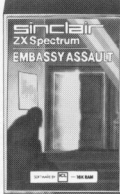
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Vu-Calc	Sinclair	16	£8.95	
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Over The Spectrum 1	Melbourne House	16	£5.95	
Over The Spectrum 2	Melbourne House	16	£5.95	
Over The Spectrum 3	Melbourne House	16	£5.95	

Title	Producer	K	RAM	Price
Backgammon	C.P. Software	48	£5.95	
Draughts	C.P. Software	48	£6.95	
<b>Practical</b>				
Vu-Calc	Sinclair	16	£8.95	
Vu-File	Sinclair	16	£8.95	
Vu-3D	Sinclair	48	£9.95	
Collectors Pack	Sinclair	48	£9.95	
Club Record Controller	Sinclair	48	£9.95	
Address Manager	Oxford	16	£8.95	
Finance Manager	Oxford	16	£8.95	
Dietron	Custom Data	16	£4.75	
<b>Program Collections</b>				
Shiva Special 1	Shiva	16	£5.95	
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# WHSMITH



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```

10 REM BALLTRAP
20 REM S.HEAP
30 MODE5:SZ=1000
40 PRINT "'DO YOU WANT SOUND"
50 INPUT"Y OR N",B$
60 IF B$="Y" N=-10 ELSE N=0
70 VDU30,9
80 UX=20+RND(800):AX=20+RND(1000):DUX=1:DAZ=2:BZ=3
90XZ=500+RND(500):YZ=400+RND(400):DXZ=-8:DYZ=-4:TIME=0
100 VDU19,2,7,0,0,0
110 VDU19,3,2,0,0,0
120 GCOL0,131:CLG
130 PROC_BOX
140 PROC_BALL
150 PROC_LINE
160 IF BZ=1 WZ=WZ+1 ELSE WZ=0
170 IF WZ=100 PROC_WIN:GOTO 190
180 IF ADVAL(0)=1 GOTO 70 ELSE GOTO 140
190 IF ADVAL(0)=1 GOTO 70 ELSE GOTO 190
200 DEFPROC_BOX
210 GCOL0,0
220 MOVE16,16:DRAW1264,16
230 DRAW1264,1004:DRAW16,1004
240 DRAW16,900:DRAW160,900
250 MOVE16,900:DRAW16,800
260 DRAW160,800:MOVE16,800
270 DRAW16,16
280 GCOL0,1:MOVE24,896
290 MOVE160,896:PLOT85,160,804
300 MOVE24,804:PLOT85,24,896
310 ENDPROC
320 DEFPROC_LINE
330 GCOL0,0
340 MOVE AX,UX
350 IF ADVAL1>50000 IF AX>20 THEN AX=AX-DAZ:GOTO 390
360 IF ADVAL1<10000 IF AX<1260 THEN AX=AX+DAZ:GOTO390
370 IF ADVAL2>50000 IF UX<1000 THEN UX=UX+DUX:GOTO390
380 IF ADVAL2<10000 IF UX>20 THEN UX=UX-DUX
390 DRAW AX,UX
400 ENDPROC
410 DEFPROC_WIN
420 VDU28,1,19,18,15:COLOUR1:COLOUR131:CLS
430 PRINT"YOU HAVE WON"
440 TZ=TIME/100:IF TZ<SZ SZ=TZ
450 PRINT"IN ";TZ;" SECS"
460 IF TZ<30 A$="CHAMP!!":GOTO500
470 IF TZ<50 A$="GOOD!":GOTO500
480 IF TZ<80 A$="NOT BAD":GOTO500
490 A$="RUBBISH-GIVE UP!!"
500 PRINT A$
510 PRINT"BEST IS ";SZ;" SECS"
520 ENDPROC
530 DEFPROC_BALL
540 IF POINT(XZ+DXZ,YZ+DYZ)<>0 GOTO580
550 IF POINT(XZ+DXZ,YZ)=0 DXZ=-DXZ
560 IF POINT(XZ,YZ+DYZ)=0 DYZ=-DYZ
570 SOUND 2,N,130,1
580 GCOL0,BZ
590 PLOT 69,XZ,YZ
600 XZ=XZ+DXZ:YZ=YZ+DYZ
610 IF POINT(XZ,YZ)=1 BZ=1 ELSE BZ=3
620 GCOL0,2
630 PLOT69,XZ,YZ
640 ENDPROC

```






# BAT AND BALL

**RUNS ON A BBC MODEL A OR B IN 16K**

**BY STEVE HEAP**

This is an interesting variation of those very early bat and ball type video games which heralded the arcade boom all those years ago. It was written primarily for the BBC Model B but can easily be converted to work on the A or B from the keyboard.

The object of the game is to trap a bouncing ball in a coloured rectangle in the top corner of the screen. To do this a continuous line is drawn using the joystick (or keyboard controls) which slowly confines the ball in a smaller and smaller area until it is finally trapped. But beware — the ball has a nasty habit of escaping through the smallest gap in your defences!

If you are successful and manage to catch the bouncing ball the time you take will be displayed — together with the best time so far. The fire button on the joystick sets up a new game at any time.

The game can be converted to work from the keyboard by changing/adding the following lines:

```
25 ON ERROR GOTO 650
62 *FX12, 1
64 *FX11, 1
66 *FX15, 0
180 IF INKEY$(0)=""*N* GOTO 66 ELSE GOTO 140
190 IF INKEY$(0)=""*N* GOTO 66 ELSE GOTO 190
345 A$=INKEY$(0)
350 IF A$="Z" IF AZ(20) THEN AZ=AZ-DAZ:GOTO 390
360 IF A$="X" IF AZ(120) THEN AZ=AZ+DAZ:GOTO 390
370 IF A$="." IF UZ(100) THEN UZ=UZ+DUZ:GOTO 390
380 IF A$="/" IF UZ(20) THEN UZ=UZ-DUZ
395 *FX15, 0
650 *FX15, 0
660 *FX12, 0
670 MODE7:END
```

# For the best hardware, the best software.

The BBC Microcomputer system is generally regarded to be the best micro in its price range you can lay your hands on. So, if you're thinking of buying one or already own one, you'll want to know about the software that's been specially designed for it.

Not surprisingly, it's made by Acornsoft, the software division of Acorn Computers Ltd., who designed and built the BBC Microcomputer. So naturally you can expect the highest quality software with the built-in ingenuity to fully exploit the BBC Micro's potential.

## Further education for everyone.

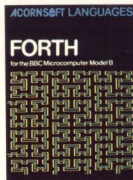
Number Balance (price £11.90) contains two programs on cassette for practising simple mathematical operations from numbers 1 to 20. The object of the exercise is to make a balance level by inputting the correct missing number into one side of a simple equation. Incorrect answers will tilt the balance in the appropriate direction; after three incorrect attempts the program responds with the correct answer.

Chemical Analysis (price £13.80) contains three Chemistry programs on cassette and a booklet. 'Elements' presents a series of mystery elements which the student is asked to identify. 'Inorganic' presents a series of inorganic substances to be

identified by performing tests selected from a menu of standard tests. 'Organic' is a program dealing with organic compounds.

## Learn more languages.

LISP (price £24.35) is the fundamental language of artificial intelligence research.



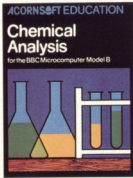
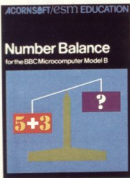
It is easy to learn, and is widely used for writing substantial and sophisticated programs, with practical applications including design of education systems and medical research.

It comes complete with a book that introduces you to programming in LISP, as well as some fascinating applications.

FORTH (price £24.35) is a complete implementation of the FORTH language to the 1979 standard specification for the BBC Microcomputer Model B. This much acclaimed programming language is also accompanied by a specially written book explaining all you need to know.

## Mind-boggling games.

Sphinx Adventure (price £9.95) is a full-sized classic adventure game in which you move through caves, fight with trolls, collect treasure and finally make your way to the sphinx



ACORNSOFT GAMES

## Sphinx Adventure

for the BBC Microcomputer Model B



ACORNSOFT GAMES

## Missile Base

for the BBC Microcomputer Model B



ACORNSOFT GAMES

## Monsters

for the BBC Microcomputer Model B



### How to get Acornsoft programs.

If you're a credit card holder and would like to buy cassettes of the programs shown in this advertisement, or if you would like to know the address of your nearest stockist, just phone 01-200 0200.

to collect your reward.

Missile Base (price £9.95) sees you as Moon Base Commander, and you must ward off the salvos of deadly neutron missiles falling from space onto your base. As the game progresses, intelligent missiles arrive on the scene. They must be destroyed with cunning. Comes complete with satellites and planes and includes a table of high scores.

Monsters (price £9.95) is a game where your man is pursued by monsters who chase him up and down ladders and along walls. The only hope of survival is to dig holes in the walls and trap the monsters by filling them in. Complete with sound effects and high score.

### Increase your business acumen.

VIEW (price £59.80) is a program that enables your machine, together with a printer, to operate as a fully operational word processor. For convenience the program is in ROM so that it can become a permanent feature of your machine. (It can easily be fitted by your local dealer.) You'll find out more by going to your dealer or by sending for the free catalogue.

Alternatively, you can buy the cassettes directly by sending off the order form below to: Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL.

Also use this form if you would like to receive the current free Acornsoft catalogue.

Please allow 28 days for delivery.

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BBC Microcomputer Model B

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PROGRAM	PRICE	QUANTITY	TOTAL	(Code Acornsoft use only)
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Lisp	£24.35			SBL02/SBD004
Forth	£24.35			SBL01/SBD003
Sphinx Adventure	£9.95			SBG07
Missile Base	£9.95			SBG18
Monsters	£9.95			SBG03

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# ACORNSOFT



# PROTECTOR

BY L. BRAINE

RUNS ON A VIC-20 IN 3.5K

Space piracy is ruining the economy of your sector of the galaxy and Star Fleet Command have ordered you, the skipper of an interstellar customs cruiser, to wipe out the pirates at any cost. Their plundering means that galactic taxes may have to put up — and there's an interplanetary election coming up!

Blasting off from your HQ after picking up your orders you soon pick up the space pirates fleet on your scanners. They are approaching you in force and closing fast. The odds are six to one. Your only chance is to quickly switch to hex-drive, which will give you two minutes of super-power and enable you to out manoeuvre the pirate ships and blast them out of the sky. Can you end the pirates reign of terror?

Your score will be shown at the top of the screen, and also the time you have left to complete your task. The high score is also shown.

The program is listed in two parts. First the user-defined graphics and second is the main program.

Program notes:

100-160: main loop. 400-460: ground movement routine. 500-565: joystick and your movement routine. 600-710: space pirates movement routine. 800-980: laser gun routine. 1000-1050: end of program routine.

```

5 POKE52,28:POKE56,28
10 DATA 255,255,255,255,255,255,255,255
20 DATA 0,0,0,0,0,0,0,255
30 DATA 0,0,0,0,0,255,255,255
40 DATA 0,0,0,0,255,255,255,255
50 DATA 0,0,255,255,255,255,255,255
60 DATA 0,0,255,255,255,255,255,255
70 DATA 0,0,255,255,255,255,255,255
80 DATA 0,255,255,255,189,189,36,66,36
90 DATA 126,98,255,189,189,36,66,36
100 DATA 0,0,0,0,63,255,31,0
110 DATA 0,12,126,255,255,254,254,0
120 DATA 0,48,126,255,255,127,127,0
130 DATA 0,0,0,0,252,255,248,0
140 DATA 73,42,0,99,0,42,73,0
150 DATA 1,3,7,15,31,63,127,255
160 DATA 128,192,254,240,248,252,254,255
170 FOR I=7168+32*8707168+32*8707168+32*8707168+32*8707168+32*8707168+32*8707168+32*8707168
180 FOR I=7168+32*8707168+32*8707168+32*8707168+32*8707168+32*8707168+32*8707168+32*8707168
190 PRINT"LOAD"
200 POKE198,3:POKE632,19:POKE633,13:POKE634,13
210 READY.
  
```





# ORIC SOFTWARE from TANSOFT

## ORIC CHESS



A superb chess game written in Basic with a Machine Code Move Search Routine. Features high resolution colour graphics, record of moves, allows Castling and En-Passant, 5 levels of play and computer can play black or white.

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Tansoft is the software division of  
Tangerine Computers.



THE MEN WHO INVENTED ME WERE  
CLEVER ENOUGH TO MAKE ME THINK  
IN 'FORTH' (IT'S 10 TIMES FASTER  
AND 4 TIMES MORE COMPACT THAN  
'BASIC').

YET THEY'RE DUMB ENOUGH TO SELL  
ME FOR £89.95!

Richard Altwasser and Steven Vickers are the men who invented the Jupiter Ace.

After years of designing micro-computers that use BASIC (both men played a major role in creating the ZX Spectrum), they abandoned it in favour of FORTH.

FORTH is just as easy to learn as BASIC. Yet it's a faster, more compact and more structured language that educationalists and professional programmers alike prefer.

So the Jupiter Ace is the only micro-computer you can buy that is designed around FORTH.

Using it, there's little fear of accidentally 'crashing' programs halfway through and having to start all over again (a common fault with BASIC). The Jupiter Ace's comprehensive error checking sees to that.

The Jupiter Ace has a full-size keyboard, high resolution graphics, sound, floating point arithmetic, a fast, reliable cassette interface, 3K of RAM and a full 12 month warranty.

You get all that for £89.95. Plus a mains adaptor, all the leads needed to connect most cassette recorders and TV's, a software catalogue (35 cassettes available, soon to be 50), the Jupiter Ace manual and a free demonstration cassette of 5 programs.

The Jupiter Ace manual is a complete introduction to personal computing and a simple-to-follow course in FORTH, from first principles to confident programming.

Plug-on 16K and 48K memory expansions are also available, at very competitive prices. (There'll be a plug-on printer interface available soon, too.)

It'll take you no time at all to realise how clever Richard and Steven were to design the Jupiter Ace around FORTH. And even less time to realise what a silly price £89.95 is to charge for it.



#### Technical Information

**Hardware**  
280A, 8K ROM; 3K RAM.

**Keyboard**  
40 moving keys; auto repeat; Caps Lock.

**Screen**  
Memory mapped 32 col x 24 line flicker-free display upper and lower case ascii characters.

**Graphics**  
High resolution 256 x 192 pixel user defined characters.

**Sound**  
Internal loudspeaker may be programmed for entire audio spectrum.

#### Cassette

Programs and data in compact dictionary format may be saved, verified, loaded and merged. All tape files are named. Running at 1500 baud.

**Expansion Port**  
Contains D.C. power rails and full Z80 Address, data and control signals. Can connect extra memory peripherals.

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Please send cheque/postal order to:  
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## Jupiter ACE

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# Snakes

You can't escape the coils of this snake as it writhes around your Oric and charms even the most worldly warrior games player. If you've played the arcade game Centipede or some similar game, you'll know just what this is all about.

If not this is what you'll see. Your slippery Oric snake has to be steered around the screen with the cursor keys, gobbling up numbers which appear at random. Each time you hit a number the length of the snake increases in proportion to the size of that number — say if you eat a 5 you'll get five extra coils, and so on.

Unfortunately your snake exists in a very confined space and the more he eats the bigger he gets and the less space there is to move around — and if he crosses his own path or bites his tail then the game is all over! Oh yes, just to make things a little more interesting the screen border is definitely no place for a snake to stray. If you hit it you are dead!

This is an addictive little game which you'll be playing again and again just to get the elusive high score.

**RUNS ON AN ORIC IN 16K**

**BY PAT NORRIS AND RICHARD JONES**

```

I REM "SNAKE" WRITTEN FOR C.& V.G..1983 R.S.JONES/P.W.NORRIS
5 LORES 0: PAPER 1: INK 7
15 FORZ=27022:PLOT0,Z,4:NEXT
20 GOSUB 300
30 PLOT S,10, "00000": LET L=5 : LETL$="8888": LET D$="B"
40 LET S=L: LET T=S+S: LET X=9: LET Y=T: LET N=0
50 LET G=INT(RND(1)*36)+1:LET H=INT(RND(1)*21)+2
60 IF SCRN(G,H)<>16ANDSCRN(G,H)<>32THEN50
110 PLOTG,H,CHR$(INT(RND(1)*9)+1+48):FORC=1TO15+INT(RND(1)*2#L)
120 IFN<1THENPLOTS,T, " ": LET T=T+(LEFT$(L$,1)="7")-(LEFT$(L$,1)="6")
125 IFN<1THENS=S-(LEFT$(L$,1)="B")+ (LEFT$(L$,1)="5")
130 LET Y=Y+(D$="7")-(D$="6"):LET X=X-(D$="B")+(D$="5")
132 LET Y=SCRN(X,Y): LET A$=CHR$(Q)
140 PLOT X,Y, "0":LET L=L+D$:IF A$>"0" AND A$<"A" THEN LET N=N+VAL
(A$)+1
145 IFA$>"0"ANDA$<"A"THENL=L+VAL(A$):C=15+2#L:PLOT24,0,STR$(L):ZAP:
GOTO160
150 IFA$<>CHR$(16)ANDA$<>CHR$(32)THEN200
160 LET A$=KEY$: IF A$>"4" AND A$<"9" THEN LET D$=A$
165 IFN>0THENN=N-1
170 NEXTC:PLOTG,H,CHR$(32-47*(G=XANDH=Y)):GOTO50
200 EXPLODE
201 PLOT S,T, " ": LET T=T+(LEFT$(L$,1)="7")-(LEFT$(L$,1)="6")
205 LET S=S-(LEFT$(L$,1)="B")+ (LEFT$(L$,1)="5")
210 L$=RIGHT$(L$,LEN(L$)-1):IFL$<>" "THEN201
215 PLOT B,B,"PRESS 'R' FOR ANOTHER"
216 PLOT B,10,"PRESS 'S' TO STOP"
220 IF KEY$="R" THEN RUN
230 IF KEY$<>"S" THEN GOTO 220
240 TEXT:CLS:LIST
300 REM BORDER
310 LORES 0
320 PLOT 1,0,"Snake
330 PLOT 0,1,"*****
340 FOR I=1 TO 22: PLOT 0,I,"*": PLOT 37,I,"*": NEXT I
350 PLOT 0,23,"*****
360 RETURN
  
```

Score :- 5



Holy Moses! God has sure given me a tough task this time. I was sitting minding my own business, thinking holy thoughts, when there was this great clap of thunder, a flash of lightning, and this voice that filled my head until I thought it was going to burst!

The voice said, "I God, instruct you Moses to lead the Israelites away from Egypt to the Promised Land. But beware as the Pharaoh will pursue you with his armies and attempt to make you slaves again. Take the road towards the Red Sea and freedom.

I will help you provided no more than 2000 Israelites die on the journey. I have one miracle that I can use to aid your escape — but you must reach the Red Sea first. The Promised Land lies on the other side of this sea which you must cross.

Then you must take the Israelites to the place of the tablets, on which are engraved the Ten Commandments. Here you will be safe from the Egyptians and any other dangers."

So that's why we are trudging across these parched lands towards our Promised Land — with the Egyptian Pharaoh's armies hot on our heels.

# THE TEN COMMANDMENTS



```

7 GRAPHICS 1:SETCOLOR 2,0,0
8 POSITION 0,10: ? #61:"the ten commandmen
ts"
9 FOR E=-10 TO 10
10 SOUND 0,200,4,10-ABS(E)
11 SOUND 1,255,4,10-ABS(E)
12 SOUND 2,225,4,10-ABS(E)
13 SOUND 3,150,4,10-ABS(E)
14 FOR K=-1 TO 200:NEXT K:NEXT E:SOUND 0,
0,0,0:SOUND 1,0,0,0:SOUND 2,0,0,0:SOUND
3,0,0,0
15 DIM A$(20)
17 GOTO 100
18 FOR F=1 TO INT((19*RND(0))+1):READ A$:N
EXT F:RETURN
20 C=SQR(0)*5
21 IF 0=1 THEN C=INT((0*0)-(INT(10*RND(0
))))
22 IF 0>1 AND 0<=2 THEN C=INT((0*0)-(INT
(10*RND(0))))
23 IF 0>2 AND 0<=3 THEN C=INT((0*0)-(INT
(10*RND(0))))
24 IF 0>3 AND 0<=4 THEN C=INT((50*RND(0
))+0*2)
25 IF 0>4 AND 0<=5 THEN C=INT((65*RND(0
))+0*2)
26 IF 0>5 THEN C=INT((99*RND(0))+0*2)
27 RETURN
30 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0:
FOR E=1 TO 8:PRINT :NEXT E:PRINT " Thou
has failed me Moses...I saideth"

```

**RUNS ON AN ATARI 400/800 IN 5K**

**BY MARK BELL**

```

31 PRINT " to You not more than 2000 peo
ple ":PRINT " should die...":D+L:" peopl
e have died."
32 FOR E=1 TO 1550:NEXT E:PRINT " ...and
so shall You.":FOR E=1 TO 999:NEXT E:GO
TO 830
33 GRAPHICS 0:SETCOLOR 2,0,0:POKE 752,1:
FOR E=1 TO 10:PRINT :NEXT E:PRINT " W
ould thou care to try again ?"
34 PRINT " (Yay or Nay)":POKE
764,255
35 IF PEEK(764)=255 THEN 35
36 IF PEEK(764)=35 THEN PRINT :PRINT "
THANKS FOR THE GAME.":POKE 764,25
5:POKE 752,0:END
37 POKE 764,255:RUN
90 PRINT " The people are unhappy becaus
e they ":PRINT "are hungry and fear deat
h or sickness.":RETURN
98 D=(D+L):IF D+L>2000 THEN 30
99 RETURN
100 I=INT(34000*RND(1))+9000
101 G=INT(90000*RND(1))+2000

```

```

102 D=INT(400*RND(1))+50
103 S=INT(420*RND(1))+20
104 Q=INT(10*RND(1))+5
105 M=INT(500*RND(1))+100
106 L=0:T=0
107 GRAPHICS 0:SETCOLOR 2,0,0:POKE 752,1
109 PRINT:PRINT:PRINT
110 PRINT " I God, instructeth You Moses
to lead":PRINT " the Israelites away fr
om Egypt to"
112 PRINT " safety. Beware as Pharoah p
ursueth":PRINT " after You with his arm
ies."
115 PRINT " If thou wouldest to take t
he road":PRINT " to the Red Sea, I would
lengthen my "
117 PRINT " help provided not more than
2000 ":PRINT "Israelites are killed. I
have but one"
118 PRINT " miracle that You are free t
o use ":PRINT " when You reach the Red
Sea. On the"
119 PRINT " other side of the sea is th
e ":PRINT " Promised Land."
120 PRINT "Take thou Israelites to the p
lace of ":PRINT " the Ten Tablets with
the Eternal "
122 PRINT " Commandments enscribed on th
em. ":PRINT " Here thou will be saf
e."
125 PRINT:PRINT:PRINT " PRESS [SPA
CE BAR] TO CONT.":POKE 764,255
126 IF PEEK(764)=255 THEN 126
127 IF PEEK(764)=12 THEN 128
128 POKE 764,255
160 IF Q<=0 THEN GOSUB 13000
162 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0
:PRINT:PRINT:PRINT:GOSUB 18
165 RESTORE
170 PRINT "There are ":I:" Israelites wi
th You.":PRINT:PRINT "You are passing t
he city of ":A$:". "
175 PRINT "The Egyptians are ":Q:IF Q<=
1 THEN PRINT " day behind You":
176 IF Q>1 THEN PRINT " days behind You.
"
178 Q=Q-1
180 IF (D+S)>230 THEN GOSUB 90
182 IF D+L>2000 THEN 30
185 GOSUB 20
190 PRINT " You're chance of succession
is ":INT(C):"%
200 PRINT:PRINT " You have ":G:" tons o
f grain. How ":PRINT " much do You wish
to share amongst "
201 PRINT " the Israelites ":INPUT Z
202 G=G-Z
203 IF G<=0 THEN GOSUB 830
204 IF Z<INT((G/Q+1)) THEN GOSUB 800
205 FOR E=1 TO 4:PRINT:PRINT:PRINT "
PRESS [SPACE BAR] TO CONT.":POKE 764,2

```

```

206 IF PEEK(764)=255 THEN 206
207 IF PEEK(764)=12 THEN 208
208 POKE 764,255
210 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0
:GOSUB 18:PRINT:PRINT "You are p
assing the town of ":A$:". "
211 RESTORE:IF M>2500 THEN GOTO 11000
212 Q=INT(250*RND(0))+100:W=INT(290*RND(
0))+50:IF Q<=0 THEN GOSUB 13000
213 PRINT:PRINT " The Egyptians are ":Q
:IF Q<=1 THEN PRINT " day behind You.":
214 IF Q>1 THEN PRINT " days behind You.
"
215 T=INT(220*RND(0))+100
216 Q=Q-1:M=(M+1):I=I-(D+W)
217 PRINT:PRINT " You have travelled ":
M:" miles so far.":IF M>2500 THEN GOTO 1
1000
219 PRINT:PRINT " There are ":I:" Israe
lites with You.":PRINT:PRINT " You have
":G:" tons of grain."
220 PRINT:PRINT " ":W+D:" Israelites
have died.":PRINT:PRINT " ":S+A:" Isr
aelites are sick."
221 D=(D+W):S=(S+A):GOSUB 98
222 GOSUB 20:PRINT:PRINT " Your chance
of succession is ":INT(C):"%
223 FOR E=1 TO 4:PRINT:PRINT:PRINT "
PRESS [SPACE BAR] TO CONT.":POKE 764,2
55
224 IF PEEK(764)=255 THEN 224
225 IF PEEK(764)=12 THEN 226
226 POKE 764,255
227 IF C<50 AND D<200 AND S<200 AND M>
=1500 THEN GOTO 11000
228 IF M>2500 THEN GOTO 11000
229 IF M<400 OR M<400 AND D>50 AND S>90
THEN GOSUB 12000
235 GOTO 160
800 PRINT:PRINT " The Israelites are re

```





volting!":PRINT :PRINT " They need more food."

810 GOSUB 20:GOTO 190

830 FOR E=1 TO 8:PRINT :NEXT E:PRINT " T here is no more grain left. ":PRINT " Th e Israelites will starve - You "

835 PRINT " have failed me Moses!":PRINT :PRINT " You must suffer the consequenc es."

840 FOR E=1 TO INT(990\*RND(1))+500 STEP 10

842 SETCOLOR 2,E,E

843 SETCOLOR 2,10,E

844 SOUND 1,255,E,6

845 SOUND 2,E,8,5

846 NEXT E

847 SOUND 1,0,0,0:SOUND 2,0,0,0:SETCOLOR 2,0,0

848 FOR E=1 TO 1000:NEXT E:GOTO 33

9050 DATA Damascus

9051 DATA Beersheba

9052 DATA JUDAEA

9053 DATA Bethlehem

9054 DATA Sidon

9055 DATA Nazareth

9056 DATA Cana

9057 DATA Jericho

9058 DATA SAMARIA

9059 DATA Jordan

9060 DATA GALILEE

9061 DATA Capernaum

9062 DATA Tyre

9063 DATA Joppa

9064 DATA Tiberias

9065 DATA Bethany

9066 DATA Gadara

9067 DATA JERUSALEM

9068 DATA Caesarea

9069 DATA Lama

11000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0

,0:FOR E=1 TO 8:PRINT :NEXT E

11010 PRINT " Thou has done well Moses i n reaching":PRINT " the Red Sea so soon. ...I will reward "

11020 PRINT "thee by parting the ocean b efore You ":PRINT " so You can pass thro ugh unharmed."

11021 FOR L=1 TO P

11022 FOR J=0 TO 45 STEP 2

11023 SOUND 0,J,8,4

11024 FOR K=1 TO 20+RND(0)\*10:NEXT K

11025 NEXT J

11026 FOR J=45 TO 0 STEP -2

11027 SOUND 0,J,8,4

11028 FOR K=1 TO 50+RND(0)\*30:NEXT K

11029 NEXT J:FOR K=1 TO 300+RND(0)\*300:N EXT K:NEXT L

11030 SOUND 0,0,0,0:GOTO 14000

12000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0 ,0:FOR E=1 TO 8:PRINT :NEXT E

12010 PRINT " Thou better buck their ide as up if ":PRINT " thou wanteth to fi nish!"

12020 FOR E=1 TO 520:NEXT E:RETURN

13000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0 ,0:FOR E=1 TO 8:PRINT :NEXT E

13010 PRINT " Moses the Egyptians are upon You!":PRINT " Thou has failed me f or the last time"

13020 PRINT " ...I shall leave thee to t he mercy ":PRINT " of the Egyptians."

13025 FOR E=1 TO 1200:NEXT E

13030 GOSUB 840:GOTO 33

14000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0 ,0:FOR E=1 TO 6:PRINT :NEXT E



14005 V=INT(8\*RND(0))+1

14010 IF D=1 THEN PRINT " Thou must hur ry as the Egyptians ":PRINT " are less t han a day away."

14015 IF D<1400 THEN PRINT " Thou have crossed the sea with only "I;V;" deaths. ":I=I-V

14020 IF D>1600 THEN PRINT " The Egyptia ns are upon thee. Thou ":PRINT " has fai led me...You will "

14025 IF D>1600 THEN PRINT "drown with the rest of your followers.":GOSUB 840

:GOTO 33

14032 PRINT " Thou is now in the Promi sed Land."

14034 PRINT " "I;" followers have cross ed safely":PRINT " with thee and await f or the final ":PRINT " journey."

14036 IF D>1400 AND D<1600 THEN PRINT " Thou is not out of danger yet as ":PRIN T " most of the Egyptian";

14038 IF D>1400 AND D<1600 THEN PRINT " arny got through and are following thee once again."

14039 IF V<4 THEN POKE 752,1

14040 IF V<4 THEN PRINT " The Egyptians are here!...There is"

14042 IF V<4 THEN PRINT " nothing we can do...They have us!":GOSUB 840:GOTO 33

14050 IF V>=4 THEN POKE 752,1

14052 PRINT " Thou has only "INT(V^2);" miles to go.":PRINT " "I;V^2;" people ha ve died since crossing."

14053 GOSUB 14090

14054 IF V>=4 THEN I=I-INT(V^2):D=D+(V^2 ):

GOSUB 98

14055 IF D<=1982 AND V<25 THEN PRINT :PO SITION 16,19:PRINT " MOSES!:"

14056 IF D<1982 AND V<25 THEN PRINT " MO SES!...Thou has made it to the ":PRINT

" place of the TEN COMMANDMENTS."

14057 X=INT((I+G)+(D\*V)-(D\*S))/100000

14060 PRINT :PRINT :PRINT " Thou scored "I;X;" points."

14070 PRINT " PRESS [SPACE B AR] TO RET.":POKE 764,255

14072 IF PEEK(764)=255 THEN 14072

14074 IF PEEK(764)=12 THEN 14076

14076 POKE 764,255:GOTO 33

14090 FOR Y=0 TO 30:FOR P=1 TO 3 STEP 2

14091 NEXT P

14092 FOR P1=1 TO 5

14093 IF P1=2 THEN GOSUB 9000

14094 FOR DF=1 TO 15:NEXT DF

14095 NEXT P1

14096 NEXT Y

14099 RETURN





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BY A. R. HEAD

RUNS ON A SHARP

MZ80K IN 2.5K

```
530 FORN=1TORU
540 J=AND(1); IF J<HA(N) THEN 570
550 G(N)=G(N)+1; T=PEEK(G(N)); IF T>0 THEN 600
560 POKEG(N), 120; POKEG(N)-1, 0
570 NEXTN
580 GOT0530
600 MUSIC="BB"BB"
610 POKEG(N), 120; POKEG(N)-1, 0
620 PRINT"THE WINNER WAS No. "N; AT" A(N,1); "/; A(N,2)
630 POK446, 20
640 IF<N> THEN PRINT"HARD LUCK"; GOT0680
650 W=INT(A(N,1)*F/A(N,2))
660 PRINT"YOU HAVE WON £"W
670 S=S+W*F
680 PRINT
690 PRINT"PRESS C TO CONTINUE"
700 GETC: IFC$="C" THEN 710
705 GOT0700
```

```
710 IFS=0 THEN 830
720 NEXTR
730 PRINT"8"
740 PRINT"AT THE END OF THIS AFTERNOONS RACING YOU HAVE £"S
750 PRINT
760 PRINT"I WISH YOU LUCK NEXT TIME"
770 PRINT
780 FORN=1T02000; NEXTN
790 PRINT"ANDHUR GO Y/N"
800 GETC: IFC$="N" THEN 880
810 IFC$="Y" THEN 880
820 GOT0120
830 PRINT"8"
840 PRINT"YOU HAVE NO MONEY LEFT- TIME TO GO HOME"
850 PRINT
860 PRINT"BETTER LUCK NEXT TIME"
870 GOT0770
880 END
890 DATA 1, 30p, 2, 00p, 2, 30p, 3, 00p, 3, 30p, 4, 00p
```

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Program notes:

Line 150 decides how many runners in the race and resets Z to the screen address of the starting position of the first runner.

Line 210 selects the odds.

Lines 220, 230 reduce the odds to the lowest denominator.

Line 250 handicaps the horse according to its odds.

530-580, the race is run between these lines. The Peek in 550

checks if a horse has finished.

POKE 446, X — print X lines down.

POKE 446, Y — print Y columns in.



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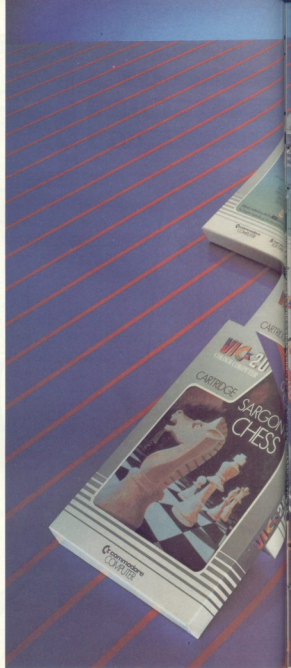
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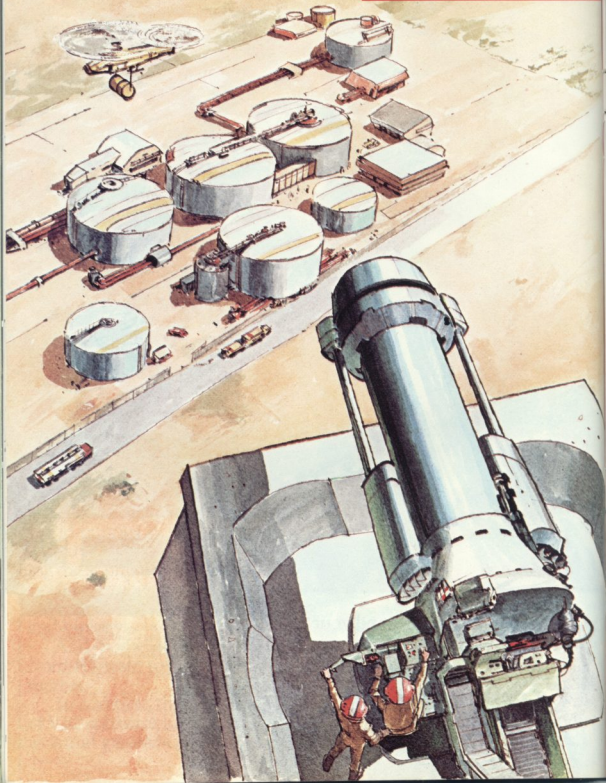
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**RUNS ON A ZX81 IN 16K**

**BY MICHAEL NADEN**



# CANNON MASTER

You perch like some sinister bird high atop a tall and graceful battle-tower waiting for the next attack — which you know will come all too soon. The enemy is determined to destroy your fuel supplies and only you — and commander of two battle-towers which defend a blasted plateau which serves as a fuel-supply depot for your armed forces — can protect the valuable stockpile. Will you be able to beat off the alien attack? Or will the invaders destroy you and your planet?

Once you have programmed in this life and death struggle you will see two towers appear on the screen. The '+' signs at the bottom of the screen mark the locations of the fuel supplies which you have to protect.

There are three cannons in each of the towers which remain hidden until fired at the advancing aliens. The laser blast from each cannon will reach halfway across the screen. To make the game harder you have limited power for your cannons. If you find they do not fire you must wait a few seconds for them to recharge.

Also the aliens can destroy your weapons — but will not be harmed themselves. They can only be destroyed by a direct hit or a collision with one of the towers.

Once two fuel-dumps are destroyed by the invaders the game is over.

The controls:

Keys 1, 2, 3, 4, or 5 fire top left cannon. Keys Q, W, E, R or T fire middle left cannon. Keys A, S, D, F or G fire bottom left cannon.

Keys 6, 7, 8, 9 or 0 fire top right cannon. Keys Y, U, I, O or P fire middle right cannon. Keys H, J, K, L or N/L fire bottom right cannon.

```
10 LET U=0
200 POKE 16418,0
30 SLOW
40 LET C=16514
50 LET S=0
60 PRINT AT 0,0;
70 FOR A=1 TO 24
80 PRINT " "
```

```
90 NEXT A
100 LET P=50
110 LET J=0
120 FOR A=1 TO 15
130 PRINT AT A,4; " "; TAB 22;
" "
140 NEXT A
150 FOR A=1 TO 4
160 PRINT TAB 4; " "
```

```
170 NEXT A
180 LET Z=1+PEEK 16396+256*PEEK
16397
190 LET A=Z+INT (RND*13)+8
200 LET B=Z+INT (RND*13)+8
210 PRINT AT 16,12; "*****"
220 POKE A,128
```

```
230 LET P=P+2.5
240 LET A=A+INT (RND*3)+32
250 IF PEEK A=8 THEN GOSUB 540
260 IF PEEK A=149 THEN GOSUB 60
0
270 POKE A,151
280 IF PEEK 16421<>255 THEN GOS
UB 360
290 POKE B,128
300 LET B=B+INT (RND*3)+32
310 IF PEEK B=8 THEN GOSUB 540
320 IF PEEK B=149 THEN GOSUB 60
0
330 POKE B,151
340 IF PEEK 16421<>255 THEN GOS
UB 360
350 GOTO 220
360 LET Q=PEEK 16421
370 PRINT AT 22,1; " "
380 IF C<0 THEN PRINT AT 22,1; "
200-218"
390 IF P<0 THEN RETURN
400 LET P=P-10
410 LET C=Z+139*(Q=247)+238*(Q=
251)+337*(Q=253)+220*(Q=239)+319
*(Q=223)+418*(Q=191)
420 LET D=(Q=247 AND Q<253)-(
Q=191 AND Q<239)
430 IF PEEK C=128 THEN RETURN
440 LET H=C
450 POKE C, (146*(D=1)+147*(D=-1
))
460 FOR C=N+D TO N+(7*D) STEP D
470 IF PEEK C=151 THEN GOTO 540
480 POKE C,150
490 NEXT C
500 FOR X=N+D TO C STEP D
510 POKE X,128
520 NEXT X
530 RETURN
540 IF PEEK C=151 THEN LET H=C
550 IF PEEK C=151 THEN LET S=S+
10
560 IF PEEK A=8 THEN LET H=A
570 IF PEEK B=8 THEN LET H=B
580 FOR I=1 TO 5
590 POKE H,23
600 FOR F=1 TO 1000
610 POKE H,151
620 NEXT I
630 POKE H,128
640 IF H=A THEN LET A=Z+INT (RN
D*14)+9
650 IF H=B THEN LET B=Z+INT (RN
D*14)+9
660 IF H=C THEN GOTO 500
670 RETURN
680 LET I=155
690 IF PEEK A=149 THEN LET H=A
700 IF PEEK B=149 THEN LET H=B
710 POKE H,I
720 POKE H-32,I
730 POKE H-34,I
740 POKE H-63,I
750 POKE H-64,I
760 POKE H-29,I
770 POKE H-37,I
780 IF I=128 AND J=4 THEN GOTO
830
790 IF I=128 THEN GOTO 640
800 LET I=128
810 LET J=1
820 GOTO 710
830 PRINT AT 21,1; "YOU SCORED "
840 LET S=S+STR$ L
850 FOR L=1 TO LEN S$
860 PRINT CHR$ (CODE S$(L)+128)
;
870 NEXT L
880 PRINT "POINTS"
890 IF S$=STR$ U THEN GOTO 940
900 IF S>U THEN LET U=S
910 PRINT AT 22,1; "NEW SCORE: "
S$
920 LET S$=STR$ U
930 GOTO 850
940 IF INKEY$<>"" THEN GOTO 940
950 PRINT AT 9,9; "HIT ANY KEY"
960 FOR F=1 TO 100000
970 PRINT AT 9,9; " "
980 IF INKEY$="" THEN GOTO 950
990 GOTO 20
```



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- On screen scoring
- High score with enter name facility
- Up to 4 players

Improved Mk 2  
version!

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- High score with enter name facility
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CVG8/83

# C & VG SOFTWARE FORM

Have you written a games program which you feel is just right for C&VG? If so we have come up with a form to ensure that we can test it out and give you our views on it, as quickly as possible.

We would prefer a tape and listing but can work from just a tape and will return it to you if it doesn't find its way into the magazine. We will also need an additional sheet explaining the game and its theme. And any documentation like lists of variables or how certain routines are working, would be of great help to beginners. Please make sure that your name, address and the program name is on everything

you send us, including the cassette itself.

This form will merely help us to keep a check on your game as it goes through our testing process and make sure we have all the information we need to present it properly in the magazine.

If you don't want to cut up the magazine, we will accept photocopies or close copies of this page. This form will be appearing regularly in C&VG issues from now on.

Remember we pay £10 for each listing published and you could win our Programmer of the Year Contest where we will try to turn the winner into a best-selling games author.

Program name: .....

Machine make: ..... Model .....

Other models it should run on: ..... Number of K needed to run it: .....

Other equipment (joysticks, Extended Basic, add ons, etc.) needed to run it: .....

Author's name: ..... Christian name: ..... Sur-name: .....

Address: .....

Tel: ..... Date: .....

Type of game: (If original please say so) .....

Loading instructions: .....

Game instructions: (If not included in the listing) .....

## Office use only

Date received: .....	Evaluator's comments
Acknowledgement sent: <input type="checkbox"/>	Good enough to publish <input type="checkbox"/>
Name of evaluator: .....	Needs some tidying up <input type="checkbox"/>
Date sent out: .....	Not worth publishing <input type="checkbox"/>
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Needs to be returned to author for alterations: <input type="checkbox"/>	Wouldn't load <input type="checkbox"/>
Due to be published in issue of magazine. ....	



MINI BLACK BOX  
by J. S. Higgins  
12-08-83

```

10 DIM v(5): DIM w(5): DIM x(5)
11 DIM y(5)
12 POKE 23609,5
13 GO TO 2000
14 REM absorption noise
15 FOR b=0 TO 12
16 BEEP .01,12
17 NEXT b
18 LET p$="absorbed"
19 INVERSE 1
20 GO TO 1200
21 REM reflection noise
22 FOR b=12 TO 14 STEP .2
23 BEEP .01,b
24 NEXT b
25 FOR b=24 TO 26 STEP .2
26 BEEP .01,b
27 NEXT b
28 LET p$="deflected"
29 GO TO 1240
30 REM reflection noise
31 FOR b=0 TO 12
32 BEEP .01,b
33 NEXT b
34 FOR b=11 TO 0 STEP -.1
35 BEEP .01,b
36 NEXT b
37 LET p$="reflected"
38 GO TO 1200
39 REM straight noise
40 FOR b=24 TO 28 STEP .2
41 BEEP .01,b
42 NEXT b
43 LET p$="straight"
44 GO TO 1240
45 REM after-ray description
46 FOR r=7 TO 11
47 PRINT AT r,0;"
48 NEXT r
49 RETURN
50 REM

```

Initialize for new game

```

35 LET paper=0: LET ink=2
36 LET currow=18: LET curcol=1
37 LET peg=0: LET right=0
38 REM input and check number
39 or pegs
40 INPUT TAB (5); "How many pegs  
(4-5)?" : i$
41 IF LEN (i$) > 1 THEN GO TO 35
42 IF CODE (i$) < 52 OR CODE (i$) > 55 THEN GO TO 35
43 LET nope9=VAL (i$)
44 IF ATTR (0,0)=122 THEN GO TO 5
45 US 2550: GO SUB 2400
46 REM randomly position pegs
47 and check that all are
48 differently positioned
49 RANDOMIZE
50 FOR n=1 TO nope9
51 LET w(n)=INT (RND*5+1)
52 LET v(n)=INT (RND*5+9)
53 FOR d=n-1 TO 1 STEP -1
54 IF v(n)=v(d) AND w(n)=w(d)
55 THEN LET n=n-1: GO TO 500
56 NEXT d
57 NEXT n
58 FOR n=1 TO nope9
59 LET x(n)=v(n)+10
60 LET y(n)=w(n)+10
61 NEXT n
62 REM

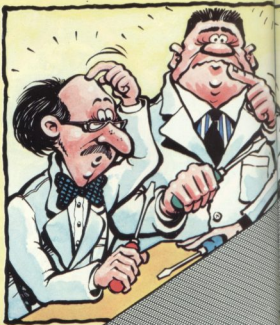
```

Normal mode

```

5000 LET deflac=0
5010 REM input and check guess
5020 INPUT TAB (6); "your guess (0-5)?" : i$
5030 IF CODE (i$) < 48 OR CODE (i$) > 57 THEN GO TO 550
5040 IF VAL (i$) < 0 OR VAL (i$) > 5 THEN GO TO 550
5050 IF VAL (i$) = 0 THEN GO TO 15

```



# THE BLACK BOX

```

500 PAPER 7: INK 2
510 GO SUB 310
520 LET entry=VAL (i$)
530 GO SUB 1480
540 IF ATTR (erow,ecol)=71 THEN
550 GO TO 720
560 REM display warning if
570 entry is already used
580 PRINT AT 7,3-(LEN (i$)-1); "
590 PRINT AT 9,1; "already"
600 PRINT AT 11,2; "used"
610 FOR b=1 TO 5
620 BEEP .05,36
630 NEXT b
640 GO TO 550
650 REM tell player that ray
660 is plotted
670 PRINT AT 7,0; "Plotting"
680 PRINT AT 9,0; "course of"
690 PRINT AT 11,0; "ray now..."

```





**RUNS ON A**

**SPECTRUM IN 48K**

**BY JEREMY HEPELL**

Dare you delve into the Black Box and decipher its hidden secrets? This is a challenging game of deduction in the Mastermind mode.

Your Spectrum will create a code which you have to crack. The code takes the shape of four pegs hidden in an eight by eight grid — the "black box".

You have to attempt to crack the code by sending in "rays" from the edges of the box. These rays always travel in a straight line — unless they hit a peg. When this happens you'll get a clue to the whereabouts of the hidden pegs.

The rays behave in a completely logical fashion. When they strike a peg the ray will either be absorbed, deflected at right angles or reflected back the way it came. From the actions of the rays you will be able to deduce the positions of the pegs. But beware some rays will follow long and tortuous routes which can be baffling!

When the game begins you are in normal mode, where you fire rays in from the outside edges of the box. When you think you know the location of any, or all, the pegs, type 0 and you will enter cursor mode. Using the controls listed on the screen you plot the pegs which you think you have found. When you reckon that you know the positions of all the pegs type in 9 (in cursor mode) and the computer will mark your final guess.

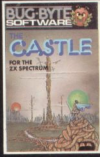
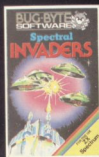
Because of the limitations of Basic the computer will sometimes take several seconds to work out a ray path.

For those of you with stiff programming fingers the title pages at the end of the listing can be left out. You must however, leave in the lines which read the user-defined graphic characters. Remember that when typing in these user-defined graphic the characters will simply be letters in graphics mode — I used A, B, C, and D.

```

750 PRINT PAPER 0: INK 7: FLASH
1: AT erow,ecol: "A"
759 REM set variables used in
plotting ray path
760 LET direct=entry
770 IF direct<5 THEN LET start
=0: GO TO 810
780 IF direct<=16 THEN LET star
t=17: GO TO 810
790 IF direct<=24 THEN LET star
t=32: GO TO 810
800 LET start=8
810 IF start<=8 THEN LET end=1:
GO TO 850
820 IF start<=16 THEN LET end=1
GO TO 850
830 IF start<=24 THEN LET end=2
GO TO 850
840 LET end=25
849 REM exit=1 for posrow path
3: ray
850 LET diff=1: IF start>end TH
EN LET diff=-1
860 FOR p=start TO end STEP dif
860 REM check for absorption
870 FOR n=1 TO npeg
880 IF v(n)=direct AND w(n)=p T
HEN GO TO 40
890 IF w(n)=direct AND x(n)=p T
HEN GO TO 40
900 IF x(n)=direct AND y(n)=p T
HEN GO TO 40
910 IF y(n)=direct AND v(n)=p T
HEN GO TO 40
920 NEXT n
930 REM check for deflection
940 FOR n=1 TO npeg
950 IF v(n)=direct+1 AND w(n)=p
THEN GO TO 1120
960 IF w(n)=direct+1 AND x(n)=p
THEN GO TO 1080
970 IF x(n)=direct+1 AND y(n)=p
THEN GO TO 1080
980 IF y(n)=direct+1 AND v(n)=p
THEN GO TO 1120
990 IF v(n)=direct-1 AND w(n)=p
THEN GO TO 1080
1000 IF w(n)=direct-1 AND x(n)=p
THEN GO TO 1120
1010 IF y(n)=direct-1 AND v(n)=p
THEN GO TO 1080
1020 NEXT n
1030 NEXT p
1033 REM check type of ray path
for rays which have entered
from the box
1040 LET exit=direct+16: IF dire
ct>16 THEN LET exit=direct-16
1050 IF exit=entry THEN GO TO 1E
0
1060 IF deflec=0 THEN GO TO 250
1070 GO TO 100
1079 REM reset variables used in
plotting ray path if ray
deflected
1080 IF p=9 OR p=17 OR p=32 OR p
=8 THEN GO TO 180
1090 LET start=direct-16: IF p=8
AND p<=24 THEN LET start=direct
+16
1100 LET direct=p+1: IF p>8 AND
p<=24 THEN LET direct=p-1
1110 GO TO 1130
1120 IF p=9 OR p=17 OR p=32 OR p
=8 THEN GO TO 180
1130 LET start=direct
1140 IF p<=8 THEN LET direct=p+1
7: GO TO 1180
1150 IF p<=16 THEN LET direct=p+
15: GO TO 1180
1160 IF p<=24 THEN LET direct=p-
17: GO TO 1180
1170 LET direct=p-15
1180 LET deflec=1
1190 GO TO 810
1199 REM set variables used in
ray path description
1200 LET posrow=1
1210 PAPER 7: INK 0
1220 GO SUB 1340
1230 GO TO 550
1233 REM reflection of straight
ray path
1240 LET posrow=0

```



# SPECTACULAR!

**BUG-BYTE  
SOFTWARE**



Selected titles available from larger branches of Boots and W.H Smith, Spectrum, Laskys, Currys Micro-C and all good Computer Shops. Also by mail order from Software Express.

```

1250 PAPER PAPER: INK INK
1260 GO SUB 1340
1270 LET guess=guess-1
1280 LET entry=exit
1290 PAPER PAPER: INK INK
1300 GO SUB 1390
1310 LET ink=ink+1
1320 IF ink=7 THEN LET ink=paper
1330 IF entry=1: LET paper=ABS (paper-7)
1340 GO TO 550
1350 REM Path description
1360 REM Path display
1370 GO SUB 310
1380 PRINT AT 7, posrow, 3 - (LEN (STR$ (entry)) - 1); entry; " "
1390 PRINT AT 9, posrow, 0; posrow
1400 IF posrow=1 THEN GO TO 1390
1410 PRINT AT 11, 2; "to "; exit
1420 GO SUB 1480
1430 PRINT AT row, col; "A"
1440 REM Update number of guesses and score
1450 PAPER 7: INK 2: INVERSE 0
1460 LET guess=guess+1
1470 PRINT AT 10, 4 - (LEN (STR$ (guess)) - 1); guess
1480 LET score=score+1
1490 IF score=9 THEN PRINT AT 20, 3; " "
1500 PRINT AT 20, 4 - (LEN (STR$ (score)) - 1); score
1510 RETURN
1520 REM Find position of row, entry for entry
1530 IF entry=5 THEN LET row=2
1540 LET ecol=11+entry*2: RETURN
1550 IF entry=16 THEN LET row=20 - (entry-8)*2: LET ecol=11: RETURN
1560 IF entry=24 THEN LET row=2
1570 LET ecol=11+(entry-16)*2: RETURN
1580 LET row=20 - (entry-24)*2: LET ecol=29: RETURN
1590 REM

```

#### CURSOR MODE

```

1519 REM Display cursor controls
1520 PAPER 7: INK 2
1530 PRINT AT 5, 0; "0 - normal"
1540 PRINT AT 5, 0; "3 - plot"
1550 PRINT AT 5, 0; "5 - left"
1560 PRINT AT 5, 0; "6 - down"
1570 PRINT AT 5, 0; "7 - up"
1580 PRINT AT 11, 0; "8 - right"
1590 PRINT AT 12, 0; "9 - final"
1600 PRINT AT 13, 0; "guess"
1610 PAPER 0
1620 INK 6: IF ATTR (currow, curcol)=65 THEN INK 2
1630 PRINT FLASH 1; AT currow, curcol; "A"
1640 REM Check cursor input
1650 LET i$=INKEY$
1660 IF i$="0" OR i$="9" THEN GO TO 1920
1670 IF i$="3" OR i$="5" THEN GO TO 1650
1680 IF i$="3" THEN GO TO 1620
1690 IF i$="4" THEN GO TO 1670
1700 REM Correctly located
1710 IF i$="5" THEN LET newrow=currow: LET newcol=curcol-2: GO TO 1740
1720 IF i$="6" THEN LET newrow=currow+2: LET newcol=curcol: GO TO 1740
1730 IF i$="7" THEN LET newrow=currow-2: LET newcol=curcol: GO TO 1740
1740 LET newrow=currow: LET newcol=curcol+2
1750 IF newrow<4 OR newrow>16 OR newcol<13 OR newcol>27 THEN GO TO 1650
1760 DEEP .05, 12
1770 INK 7: IF ATTR (currow, curcol)=194 THEN INK 2
1780 PRINT FLASH 0; AT currow, curcol; "A"
1790 INK 8: IF ATTR (newrow, newcol)=65 THEN INK 2
1800 PRINT FLASH 1; AT newrow, newcol; "A"
1810 LET currow=newrow: LET curcol=newcol

```

```

1810 GO TO 1650
1820 REM Plot peg
1830 IF ATTR (currow, curcol)=194 THEN GO TO 1650
1840 BEEP .05, 0
1850 PRINT; INK 2; FLASH 1; AT currow, curcol; "A"
1860 GO TO peg=peg+1
1870 REM Correctly located
1880 IF ATTR (currow, curcol)=194 THEN GO TO 1650
1890 PRINT; INK 6; FLASH 1; AT currow, curcol; "A"
1900 LET peg=peg-1
1910 GO TO 1650
1920 REM Correctly located
1930 INK 7: IF ATTR (currow, curcol)=194 THEN INK 2
1940 PRINT FLASH 0; AT currow, curcol; "A"
1950 IF r=5 TO 13
1960 PRINT AT r, 0; " "
1970 IF i$="0" THEN GO TO 550
1980 IF peg=9 THEN GO TO 205
1990 REM Display warning
2000 number of pegs plotted
2010 PAPER 7: INK 2
2020 GO SUB 310
2030 PRINT AT 7, 1; "nopeg; " pegs"
2040 PRINT AT 9, 1; "must be"
2050 FOR b=1 TO 5
2060 BEEP .05, 36
2070 NEXT b
2080 PAUSE 0: PAUSE 100
2090 GO TO 1520
2100 REM

```

#### Final guess

```

2089 REM Check each guess
2090 FOR n=1 TO nopeg
2100 IF ATTR (ABS (w(n)-3)*2-20, (n)*2+11)=71 THEN GO SUB 2200: GO TO 2120
2110 GO SUB 2140
2120 NEXT n
2130 GO TO 2230
2140 REM Correctly located
2150 PRINT PAPER 7: INK 6; FLASH 1; AT ABS (w(n)-8)*2-20, v(n)*2+1; "A"
2160 LET right=right+1
2170 FOR b=1 TO 5
2180 BEEP .05, 24
2190 NEXT b
2200 RETURN
2210 REM Incorrectly located
2220 PRINT PAPER 0: INK 6; FLASH 1; AT ABS (w(n)-8)*2-20, v(n)*2+1; "A"
2230 PAPER 7: INK 2: FLASH 0
2240 FOR b=1 TO 5
2250 LET score=score-1
2260 LET poscol=poscol-1
2270 IF score<9 THEN LET score=0
2280 PRINT AT 20, 3; " "
2290 BEEP .05, 12
2300 NEXT b
2310 RETURN
2320 REM Display number of pegs
2330 PAPER 7: INK 2
2340 GO SUB 310
2350 PRINT AT 7, 2; "Your"
2360 IF score=9: "score is"
2370 IF score=25 THEN PRINT AT 11, 1; "very good"
2380 IF score=20 THEN PRINT AT 11, 1; "good"
2390 IF score=15 THEN PRINT AT 11, 1; "not bad"
2400 IF score=10 THEN PRINT AT 11, 2; "poor"
2410 IF score=5 THEN PRINT AT 11, 2; "poor"
2420 IF score=0 THEN PRINT AT 11, 2; "poor"
2430 IF score=0 THEN PRINT AT 11, 2; "poor"
2440 IF score=0 THEN PRINT AT 11, 2; "poor"
2450 IF score=0 THEN PRINT AT 11, 2; "poor"
2460 IF score=0 THEN PRINT AT 11, 2; "poor"
2470 IF score=0 THEN PRINT AT 11, 2; "poor"
2480 IF score=0 THEN PRINT AT 11, 2; "poor"
2490 IF score=0 THEN PRINT AT 11, 2; "poor"
2500 IF score=0 THEN PRINT AT 11, 2; "poor"
2510 IF score=0 THEN PRINT AT 11, 2; "poor"
2520 IF score=0 THEN PRINT AT 11, 2; "poor"
2530 IF score=0 THEN PRINT AT 11, 2; "poor"
2540 IF score=0 THEN PRINT AT 11, 2; "poor"
2550 IF score=0 THEN PRINT AT 11, 2; "poor"
2560 IF score=0 THEN PRINT AT 11, 2; "poor"
2570 IF score=0 THEN PRINT AT 11, 2; "poor"
2580 IF score=0 THEN PRINT AT 11, 2; "poor"
2590 IF score=0 THEN PRINT AT 11, 2; "poor"
2600 IF score=0 THEN PRINT AT 11, 2; "poor"
2610 IF score=0 THEN PRINT AT 11, 2; "poor"
2620 IF score=0 THEN PRINT AT 11, 2; "poor"
2630 IF score=0 THEN PRINT AT 11, 2; "poor"
2640 IF score=0 THEN PRINT AT 11, 2; "poor"
2650 IF score=0 THEN PRINT AT 11, 2; "poor"
2660 IF score=0 THEN PRINT AT 11, 2; "poor"
2670 IF score=0 THEN PRINT AT 11, 2; "poor"
2680 IF score=0 THEN PRINT AT 11, 2; "poor"
2690 IF score=0 THEN PRINT AT 11, 2; "poor"
2700 IF score=0 THEN PRINT AT 11, 2; "poor"
2710 IF score=0 THEN PRINT AT 11, 2; "poor"
2720 IF score=0 THEN PRINT AT 11, 2; "poor"
2730 IF score=0 THEN PRINT AT 11, 2; "poor"
2740 IF score=0 THEN PRINT AT 11, 2; "poor"
2750 IF score=0 THEN PRINT AT 11, 2; "poor"
2760 IF score=0 THEN PRINT AT 11, 2; "poor"
2770 IF score=0 THEN PRINT AT 11, 2; "poor"
2780 IF score=0 THEN PRINT AT 11, 2; "poor"
2790 IF score=0 THEN PRINT AT 11, 2; "poor"
2800 IF score=0 THEN PRINT AT 11, 2; "poor"
2810 IF score=0 THEN PRINT AT 11, 2; "poor"
2820 IF score=0 THEN PRINT AT 11, 2; "poor"
2830 IF score=0 THEN PRINT AT 11, 2; "poor"
2840 IF score=0 THEN PRINT AT 11, 2; "poor"
2850 IF score=0 THEN PRINT AT 11, 2; "poor"
2860 IF score=0 THEN PRINT AT 11, 2; "poor"
2870 IF score=0 THEN PRINT AT 11, 2; "poor"
2880 IF score=0 THEN PRINT AT 11, 2; "poor"
2890 IF score=0 THEN PRINT AT 11, 2; "poor"
2900 IF score=0 THEN PRINT AT 11, 2; "poor"
2910 IF score=0 THEN PRINT AT 11, 2; "poor"
2920 IF score=0 THEN PRINT AT 11, 2; "poor"
2930 IF score=0 THEN PRINT AT 11, 2; "poor"
2940 IF score=0 THEN PRINT AT 11, 2; "poor"
2950 IF score=0 THEN PRINT AT 11, 2; "poor"
2960 IF score=0 THEN PRINT AT 11, 2; "poor"
2970 IF score=0 THEN PRINT AT 11, 2; "poor"
2980 IF score=0 THEN PRINT AT 11, 2; "poor"
2990 IF score=0 THEN PRINT AT 11, 2; "poor"
3000 IF score=0 THEN PRINT AT 11, 2; "poor"

```



```

2140 IF score>=0 THEN PRINT AT 1
2150 "very poor" : GO TO 2440
2160 PRINT AT 1,1;"abyssal"
2170 REM Input and check what's
2180 "1-2-3-4"
2190 INPUT TAB (4);"Play game ag
2200 in (y/n)?" : IF " THEN PAPER 0: GO
2210 IF " THEN PAPER 0: GO TO 350
2220 SUB 2490: GO TO 350
2230 IF " THEN GO TO 2440
2240 BORDER 7: PAPER 7: INK 0: B
2250 LIGHT 0: CLS
2260 STOP
2270 REM

```

**Draw box**

```

4009 REM (erase box after game)
4010 PAPER 7
4020 PRINT AT 16,3;" "
4030 PRINT AT 20,3;" "
4040 LET score=33: LET guess=-1
4050 GO SUB 1410
4060 PAPER 0: INK 7
4070 PRINT AT 2,13;"

```

**FOR r=4 TO 18 STEP 2**

```

660 FOR r=4 TO 18 STEP 2
670 PRINT AT r,11;"
680 FOR c=13 TO 27 STEP 2
690 PRINT AT r,c;"A"
700 NEXT c
710 PRINT AT r,29;" "
720 NEXT r
730 PRINT AT 20,13;"

```

**RETURN**

```

740 REM (erase box, outlines it)
750 PAPER 0: INK 7: CLS
760 PRINT AT 0,0;" M I N I"
770 PRINT AT 2,0;" B L A C K"
780 PRINT AT 4,0;" B O X"
790 PRINT AT 4,0;" Guesses "
800 PRINT AT 16,0;" Score "
810 PRINT AT 0,13;" 1 1 1 2 2
820 PRINT AT 1,13;" 7 8 9 0 1 2
830 FOR r=0 TO 1 STEP -1
840 PRINT AT ABS (r*2-19),12;"E
850 BCBCBCBCBCBCBCB
860 PRINT AT ABS (r*2-20),9;"r+
870 TAB 11;" D D D D D D D D
880 NEXT r
890 PRINT AT 19,12;"BCBCBCBCBCB
900 PRINT AT 21,13;"1 2 3 4 5 E
910 RETURN
920 REM

```

#### **Title pages**

```

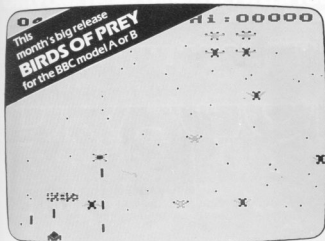
799 REM Introduction
800 BORDER 0: PAPER 0: INK 5: F
801 "0: BRIGHT 1: OVER 0: INVERS
802 "
803 CLS
804 FOR r=0 TO 21
805 IF r=12 THEN INK 0
806 IF r=13 THEN INK 0
807 BEEP .01,24: BEEP .01,r
808 PRINT AT r,0;"BLACK BOX"

```

```

850 PRINT AT ABS (r-21),14;"MIN
860 PRINT AT r,22;"BLACK BOX"
870 NEXT r
880 INK 0
890 FOR r=21 TO 0 STEP -1
900 IF r=12 THEN INK 2
910 IF r=13 THEN INK 0
920 PRINT AT r,0;"BLACK BOX"
930 PRINT AT ABS (r-21),14;"MIN
940 PRINT AT r,22;"BLACK BOX"
950 BEEP .01,24: BEEP .01,r
960 NEXT r
970 INK 2
980 PRINT AT 12,14;" "
990 FOR c=0 TO 11
1000 PRINT AT 12,c;" "
1010 PRINT AT 12,ABS (c-22);" "
1020 PRINT AT 12,c+1;"BLACK BOX
1030 PRINT AT 12,ABS (c-21);"BLA
1040 PRINT AT 12,ABS (c-21);"BLA
1050 BEEP .01,24
1060 NEXT c
1070 FOR b=24 TO 0 STEP -1
1080 BEEP .01,b
1090 NEXT b
1100 FOR b=1 TO 24
1110 BEEP .01,b
1120 NEXT b
1130 INK 7
1140 PRINT AT 6,10;"Waddington's
1150 PRINT AT 9,14;"MINI"
1160 PRINT AT 12,13;"BLACK BOX"
1170 REM Read data for user-
1180 defined graphics characters
1190 FOR g=1 TO 4
1200 READ g
1210 FOR l=0 TO 7
1220 READ line
1230 POKE USR g+l,line
1240 NEXT l
1250 NEXT g
1260 PRINT AT 21,3;"Press any ke
1270 play game"
1280 IF INKEY$="" THEN GO TO 325
1290 REM (display controls)
1300 CLS
1310 PRINT PAPER 7: INK 2;"Conti-
1320 "s"
1330 PRINT AT 3,0;"Normal mode"
1340 PRINT "(for guesses)"
1350 PRINT "into cursor mode"
1360 PRINT "1-32 "
1370 PRINT "your guesses"
1380 PRINT AT 10,0;"Cursor mode"
1390 PRINT "(for plotting pegs)"
1400 PRINT "Print 0
1410 return to normal mode"
1420 PRINT "3 "
1430 PRINT "plot a peg"
1440 PRINT "4 "
1450 PRINT "erase a peg"
1460 PRINT "5 " - cursor left
1470 PRINT "6 " - cursor dow
1480 PRINT "7 " - cursor u
1490 PRINT "8 " - cursor righ
1500 PRINT "9 " - for your
1510 final guess"
1520 GO TO 350
1530 REM Read data for user-defined
1540 graphics characters
1550 DATA "A".BIN 00000000,BIN 0
1560 0111100,BIN 0111110,BIN 011111
1570 0,BIN 0111110,BIN 0111110,BIN
1580 00111100,BIN 00000000
1590 3440 DATA "B".BIN 00011000,BIN 0
1600 0011000,BIN 00011000,BIN 111111
1610 1,BIN 1111111,BIN 00011000,BIN
1620 00011000,BIN 00011000
1630 3450 DATA "C".BIN 00000000,BIN 0
1640 0000000,BIN 00000000,BIN 1111111
1650 1,BIN 1111111,BIN 00000000,BIN
1660 00000000,BIN 00000000
1670 3460 DATA "D".BIN 00011000,BIN 0
1680 0011000,BIN 00011000,BIN 0001100
1690 0,BIN 00011000,BIN 00011000,BIN
1700 00011000,BIN 00011000

```



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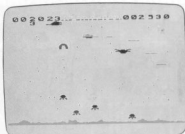
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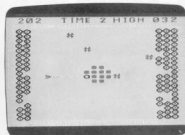
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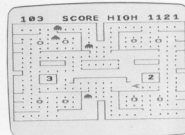
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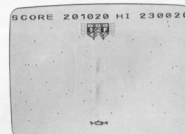
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ZX Spectrum

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May 1983

192pp  
(paper) £5.95

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by Tim Hartnell,  
Foreword by Clive Sinclair

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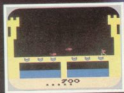
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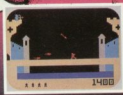
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Your best space fighter pilots have been briefed about this mission. They know they may not return. They must attack the Death Star's most vulnerable spot — which can only be reached by flying down a narrow "trench" on the star's vast superstructure.

The trench will be protected by fast Tie fighters, flown by the Imperial Alliance's most accomplished pilots, and there are laser cannons posi-

tioned in and around the trench itself. You join the action just as the rebel fighters are zapping down in to the trench to do battle with the Imperial forces. Your ship is protected by an energy shield which is depleted each time an enemy cannon scores a hit on your craft.

You have to travel along the trench shooting down enemy fighters and when the radio-active waste exhaust chute opening appears you must score a direct hit on it to restore your shields and destroy the deadly Death Star.

You must shoot down all your attackers too — if you simply dodge one he'll be back to blast you out of the skies when you least expect it.

So stand by for action — and watch out for the Imperial fleet!



```

10 R=10
11 W=0
12 R1=0
13 F1=0:F2=0:F3=0:F4=0
14 GOTO 20
20 H=0
30 SC=0
40 CLS
50 GOTO 220
60 PLAY"12350504WJSC"-IF PPOINT(X+10,Y)>4 THEN GOTO 70 ELSE GOTO180
70 IF S=1 THEN GOTO 180
80 IF R2=10 THEN GOTO 180
90 IF R2=10 THEN R2=R1:R1=R1+S:S=1:RES=R1:GOTO 170
100 IF F=1 THEN SC=SC+100
110 IF F=2 THEN SC=SC+75
120 IF F=3 THEN SC=SC+50
130 IF F=4 THEN SC=SC+25
140 F=1:PUT(C1,B1)=(C1+25,B1+14):F3=B120:H=H+1
150 PLAY"012350504WJSC"
160 GOTO 180
170 PLAY"031250504DEFFEDGERREB04C"
180 REM
190 LINE(70,192)-(X+10,Y),PSET:LINE(185,192)-(X+10,Y),PSET
200 RETURN
    
```



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```

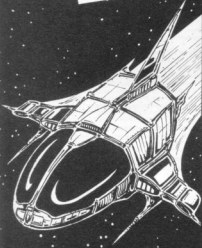
1070 IF A#2 THEN C=C
1080 IF A#3 THEN C=C-10
1090 B#120-C#120
1100 PUT(C,B)-(C+20,B+10),F1,PSET
1110 C1=C-B1#0
1120 IF W#4 THEN GOTO 100
1130 IF B#2 THEN GOTO 100
1140 RETURN
1150 A#A#NDX(3)
1160 IF A#1 THEN C=C+10
1170 IF A#2 THEN C=C
1180 IF A#3 THEN C=C-10
1190 PUT(C,B)-(C+22,B+12),F2,PSET
1200 C1=C-B1#0
1210 IF W#3 THEN GOTO 120
1220 IF B#2 THEN GOTO 120
1230 IF B#2 THEN LINE(C1+11,B1+12)-(120,192),PSET,RES=RES-1,PLAY"T25050C04G"
1240 GOTO 1610
1250 IF A#1 THEN C=C+10
1260 IF A#2 THEN C=C
1270 IF A#3 THEN C=C-10
1280 PUT(C,B)-(C+26,B+14),F3,PSET
1290 C1=C-B1#0
1300 IF W#2 THEN GOTO 130
1310 IF B#2 THEN LINE(C1+13,B1+14)-(120,192),PSET,RES=RES-1,PLAY"T25050C04G"
1320 RETURN
1330 A#A#NDX(3)
1340 IF A#1 THEN C=C+10
1350 IF A#2 THEN C=C
1360 IF A#3 THEN C=C-10
1370 PUT(C,B)-(C+32,B+20),F4,PSET
1380 C1=C-B1#0
1390 IF W#1 THEN GOTO 140
1400 IF B#2 THEN LINE(C1+16,B1+20)-(120,192),PSET,RES=RES-1,PLAY"T25050C04G"
1410 IF B1=20 THEN B=120
1420 RETURN
1430 END
1440 DIST=256
1450 RES#1
1460 RES#1
1470 A#A#
1480 A#A#
1490 Z#100
1500 D#0
1510 LINE(0,0)-(RES,0),PSET
1520 IF R1=120 THEN R1=120
1530 S#0
1540 RETURN
1550 CLS3
1560 HS#PEEK(12289)*100
1570 IF SC#HS THEN HS#SC

```

```

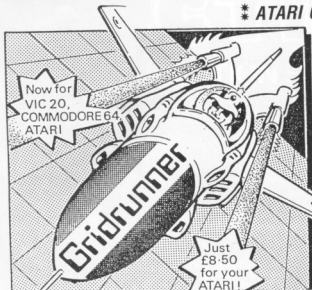
1570 PRINT$2,"YOUR SHIELD WAS DESTROYED BY CANNON FIRE"
1580 GOTO 1610
1590 CLS3:PRINT$2,"YOU WERE SHOT DOWN BY A T.I.E FIGHTER WHICH YOU HAD NOT
DESTROYED ON THE WAY TO THE HOLE"
1600 HS#PEEK(12289)*100
1610 IF SC#HS THEN HS#SC
1620 PRINT$25,"SCORE",SC
1630 SC#HS
1640 PRINT$37,"HIGH SCORE",HS
1650 HS#HS
1660 PEEK(12289),HS
1670 PRINT$449,"ANOTHER GOT(Y/N)";
1680 Q#INKEY$:IF LEFT$(Q,1)="Y" OR LEFT$(Q,1)="R" THEN GOTO 1670
1690 IF LEFT$(Q,1)="N" THEN END
1700 GOTO 1640
1710 PRINT$1,"INSTRUCTIONS(Y/N)";
1720 Q#INKEY$:IF LEFT$(Q,1)="N" THEN M#0:GOTO 2000
1730 IF LEFT$(Q,1)="Y" THEN RUN
1740 GOTO 1680
1750 END
1760 IF X#100 AND Y#0 THEN GOTO 1550
1770 PRINT(130,Z),4,3
1780 Z#Z+10
1790 COLOR4,2
1800 IF Z#105 THEN Z=100:DIST=256:LINE(0,5)-(DIST,5),PSET,W1#M1#M1#1:S#0
1810 RETURN
1820 P#0:CLS
1830 A#B#100,100,C4;B#2H2U4E2G2D2R6E2F2L3J4F2E2L3R3U2R5U2H2F2D4G2"
1840 DIMP(120,10)
1850 DRAW#0
1860 GET(100,90)-(120,100),F1,G
1870 CLS
1880 GET(130,22,12)
1890 B#B#100,100,C4;B#4H3U3E3G3D3R4E5D2G3R2D2R4U2L4R4H3U2F4D3R6G3E3U3H3
1900 DRAW#0
1910 GET(130,90)-(152,100),F2,G
1920 CLS
1930 C#B#100,150,C4;B#4H3U3E3G3D3R3E4R3U2D2R3L4G4R2U2D3L2F3R7L2E3L7R7U3H4F4R2H
4#4D3U1R3U3H3F3O3G3
1940 DIMP(26,14)
1950 DRAW#0
1960 GET(100,136)-(126,150),F3,G
1970 CLS
1980 C#B#150,150,C4;B#6H6U6E6G6D6R6E6D6L6G4R2D2F4R4E4G2L6U2R3U3H2F2R6S5U3H
6F6O6G6
1990 DRAW#0
2000 DIMP(432,20)
2010 GET(150,130)-(182,150),F4,G
2020 RETURN
2030 CLS3:PRINT$405,"PRESS SPACE TO LAUNCH";FOR P#1 TO 500:NEXT
2040 Q#INKEY$:IF Q#=" " THEN GOTO 2030
2050 PRINT$405," ";
2060 FOR P#1 TO 500:NEXT
2070 GOTO 2030
2080 CLS3:FOR L#1 TO 800:NEXTL:GOTO 700

```



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Your spacecraft must attack the descending aliens and frustrate their evil intent. Fly your Ramjet fighter over the Andes mountain range and protect your llamas from kidnapping by hostile UFOs. Features 5 kinds of UFO, controls include up, down, reverse, fire, thrust and smart bomb. Entirely in machine code. Requires 8K expansion and joystick. £8.50 + 50p P & P.

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This is VIC 20 cross breed between the now famed 'Packman' and the game 'Quix'. All in machine code, fast and fun with joystick controls, uses Hi-Res colour graphics. 8K or larger expansion needed. Only £6.00 + 50p P & P complete with instructions.

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### ATTACK OF THE MUTANT CAMELS

Planet Earth needs you! Hostile aliens have used genetic engineering to mutate camels from normally harmless beasts into 90 foot high, neutronium shielded, laser-spraying death camels! Can you fly your tiny, manoeuvrable fighter over the mountainous landscape to weaken and destroy the camels before they invade the human strong hold? You must withstand withering laser fire and alien UFOs. Game action stretches over 10 screen lengths and features super scrolling, scanner, 1:2 player action and unbelievable animation! Play this game and you'll never be able to visit a zoo again without getting an itchy trigger finger! Awesome m/c action! £8.50 + 50p P & P.

### ROX-64

Rox is a challenging game involving the defence of your lunar base from a deadly meteor shower. Rox-64 includes amazing sprite graphics displays and space sound effects, and an awesome 'motherf---' display if you win the game. Top 10 scores are tabled along with their names. This program shows just what can be achieved using only Commodore-64 basic. Study the listing and learn how to use sprites and sound on this outstanding machine. £4.95 + 50p P & P.

## ZX81

### CENTPEDE (16K)

The ORIGINAL game from the ORIGINAL author. This is the identical program to that being sold by other companies for three times our price. The game has received ecstatic reviews in the computing press. Program has 30 speed levels and ever increasing Centipede hordes. Tables top 10 scores and names. Why wait to pay more? Only £1.95 + 50p P & P.



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## MIND OVER MATTER...

Now that my series of programming tips has been concluded, I shall be devoting a corner to hints on solving some of the more difficult problems that are stumping Adventure-playing readers.

These will be printed upside down, so as not to catch the eyes of those wishing to battle on!

Readers often write to me requesting help but unfortunately, although I have played many Adventures, I have not solved them all! So help me to help fellow Adventurers by writing to me with tips.

At the moment David Coverley and Anthony Sanford are languishing in Aric's 'Ship of Doom', unable to set the key from under the glass.

Steven Milligan, meanwhile, hasn't cracked the secret of Aric's 'Espionage Island'. Can you help me help them, and save them from otherwise certain insanity?

What's in a package? How much are you tempted by a large attractive box in a plastic bubble, covered with a design suggesting fantasy and excitement within?

Do you ever suspect that you may have had to pay a few pounds less had that same cassette been more plainly wrapped? The ultimate test, of course, is in the invisible magnetic impressions on that cassette.

Here we have two games. One is lavishly packaged in a beautifully illustrated box, and quite expensive; the other supplied on a proprietary cassette with a duplicated instruction sheet, and at the low end of the price spectrum. No pun intended!

*Transylvanian Tower* is billed as a 'spine-chilling new Adventure' for the 48k Spectrum. Unfortunately it is not.

There are five levels in the tower, and the player's objective is to reach the top, kill Count Dracula, and raid his treasure trove. Each level consists of a maze, and each has different characteristics.

A floor plan of the level can be called up, with increasing difficulty as one nears the top.

Objects, many of which have magical properties, may be picked up if seen by typing "P", but only three may be carried simultaneously.

The same is screened graphically in colour and bats, which are a hazard, can be seen flapping around. Sufficient must be killed to enable you to move up a level. How do you kill the bats to get to Dracula? Would you believe with a laser gun?

This might be a reasonable maze game, but good Adventure it is not. From Richard Shepherd Software, this is disappointing after *Shaken not Stirred*.

For £6.50 you will get the game on a TDK cassette, and a fairly comprehensive two-page description of how to load and play the game.

*I am Overmind;  
Ruler of mortals, destroyer of worlds!  
Know me, obey me, and despair!*

With terror in your heart, you wish Overmind dead. But Overmind is omniscient, knowing even your innermost thoughts, and inflicts upon you the pain of a thousand lashes.

Before you start playing *Empire of the Overmind* it is almost essential to read the Rhyme of the Overmind, supplied with the game.

On starting, you find yourself among mountains and brooks, where tracks and trails abound, and ever present in the sky is a large red planet.

A mysterious stone tower appears to hold no secrets other than an animated skeleton who clobbers you as soon as you take the key which hopefully will unlock an iron door. Unconscious, your body is moved. You will more than likely end up in a very dark place. I did many times, and despaired.

But the game imparts such a feeling of intense hatred toward Overmind, that I was determined not to be beaten.

Thus, I came to a place where there was a large blue planet in the sky. I haven't yet defeated Overmind but I shall return to fight again!

At first the game appears insoluble due to the difficulty of getting out of the "very dark place". However, and this may help the disheartened player, when "clobbered" unconscious, you don't always end up in "a very dark place". I'll say no more than that!

Another problem is that it appears a held object cannot be used (although it may be dropped) unless it heads the inventory list.

Whether or not this feature is deliberate is hard to say, but it involves the rather tedious task of dropping every

object that precedes the required one in the inventory list, using it, and then picking up the discarded ones.

This task isn't aided by the rather slow response time. Whilst the reply is screened quickly enough, the prompt sometimes takes a long time to appear, and a fast player can easily lose all or part of his next command without realising it.

A large colourful box, complete with internal plastic moulding, housed *Empire of the Overmind*. Also included was a double page of detailed, well printed instructions on how to load and save the game on a 48k Apple, 48k TRS-80, and 40k Atari 800.

This was quite important, as the methods although simple were not obvious. Also in the package was 'Rhyme of the Overmind', a long and rather well-written poem printed in script on pale blue parchment-like paper.

This covered a number of pages held together with a silken cord embellished with — yes! — a tassel!

Oh, I nearly forgot! The box also contained a cassette containing all three versions of the game.

It is available from Avalon Hill Games of 680 High Road, North Finchley, London N12 0NL for £17.95 on cassette, £20.95 on disc.

### ADVENTURE TIPS

**Howdy!** The stage arrived last week bringing cries of help from a number of would-be cowboys in Ghost Town.

There they are, standing next to a pesky horse, and quite unable to get the darned critter movin'. Now then folks, don't go getting no fancy ideas that I'm gonna give away all my ol' pal Scott's secrets. Leastwise, not unless you take me down to that there saloon and fetch me something a mite stronger than what's in your Golden Derringer.

Nope — just a few hints to chew over until you get right inspired, that's all you'll get out of me!

#### WARNING:

Turning this page upside-down may damage your Adventure!

round and round you new get giddy.  
right words. If this problem sends you  
horse is shod, mount him and say the  
The solution is magnetic. When the  
jail. The key to the jail is in the stable.  
The key to shooting the horse is in the

**BY KEITH CAMPBELL**

# CHESS



## THE DUCHESS AND KAISSA

I left you with a celebrated position (figure 1) from the first round game between Duchess and Kaissa, at that time the reigning world champion program, at the second world computer chess championship in Toronto in 1977.

In the diagrammed position, Duchess (White) had just played 34. Q-R8ch, a check which can be parried by a King move to N2.

However, Kaissa's next move astounded the entire audience, which included former world (human) champion Mikhail Botvinnik and other strong masters, plus the team of expert commentators.

It played 34... R-K1, placing the Rook en prise. After Duchess' 35. QxRch, Kaissa lost quickly. The task for Kaissa's programmers before the next round was to find out what caused the program to commit such a gross blunder and correct the fault.

Only later was it realised that Kaissa's 34th move was not a blunder at all. If instead Black had played 34... K-N2, White could give checkmate by the Queen sacrifice 35. Q-B8ch! followed, after 35... KxQ by 36. B-R8ch.

Whether Black now were to play 36... B-N2 or 36... K-N1, 37. R-B8ch would be checkmate (apart from irrelevant sacrifices by Black to delay the end by a move or two).

Kaissa's evaluation function clearly ranked losing a Rook as preferable to being checkmated, which solves the mystery. However, the question remains: is 34... R-K1 a blunder or a brilliancy?

## ROOK DILEMMA

It is surprisingly difficult to answer this with confidence. Objectively, losing a Rook must be preferable, but it could be argued that losing the Rook is only slightly less fatal, does not postpone checkmate very long, and moreover even the humblest beginner would capture the Rook, whereas even quite a good player might just conceivably

overlook the checkmate.

Against an opponent who played 34. Q-R8ch in full knowledge of all the variations that could follow, it makes little difference what Black plays, the best course of action probably being to resign, but what if White had played the check in ignorance, simply as an "irritant" to Black?

What if White were a weak player and Black a Grandmaster (an unlikely event admittedly, but quite possible in a simultaneous tournament or in a material odds game?).

## STAYING ALIVE

Would it be better to move the King and rely on White not following up properly (as well as the checkmate there is the strong reply 35. R-B8, of course) or to give up the Rook to guarantee staying "alive"?



and then hope somehow to win even though a Rook behind in material?

The problem becomes more difficult if the details are changed a little: what if Black were already a Bishop ahead or if the checkmate were 10 moves (each side) deep, or both?

Considerations of this kind are far from irrelevant in computer play, where programs can often vary considerably in analytic powers, and where a program will frequently be "blind" to a strong move which human experts perceive easily.

It would be completely wrong to assume that all computer chess programs are deep or infallible analysts (although some are extremely good).

In particular it would be a mistake for the best analyst (BELLE at present) to assume all its opponents were equally good.

There is a well-known joke about an ultra-intelligent chess-playing program considering its first move in a game, as White.

After hours of analysis it decides that the opening position is, after all, a forced win for Black in every variation.

Rather than waste any more time defending a hopeless position, it immediately resigns without playing a move!

The flaw in the argument is, of course, that chess is a contest where the opponent's fallibility plays a crucial part.

So, how would Kaissa have made its decision? From a competitive viewpoint, it should have taken the strength of its opponent into account.

No doubt Duchess was strong enough to win when a Rook ahead, but would its analysis algorithm have caused it to consider the Queen sacrifice?

If it did, would it have been able to look far enough ahead to discover the checkmate?

In more subtle ways, judgements about the skill level of the opponent are an important part of human play. Grandmasters prepare specially for their major opponents by studying their games and playing style, and looking for weaknesses.

It is interesting to speculate whether chess-playing programs of the future will include representations of their main rivals' algorithms in a similar way.



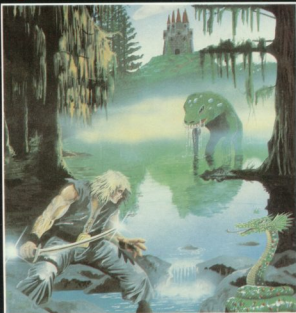
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# FIND THE ENEMY

0000	00100	ORG	0
	00101 (X)(16) - RANGE		
	00102 =====		
	00103 FINDS ENEMY		
	00104 =====		
	00105 ;		
0080A	00116 NA	EDU	275380
0000	00117 TB	EDU	273440
0076E	00120 INIT	EDU	07668H
00772	00121 SAVE	EDU	07772H
00776	00122 ADD	EDU	07776H
0077A	00123 SUB	EDU	0777AH
0077E	00124 TEST	EDU	0777EH
0078A	00126 JLOOKA	EDU	7F9AH
0000 0021066A	00200	LD	IX,TB
0004 0001	00300	LD	B,1
0006 05	00400	DEC	B
0007 0006	00500	LD	C,6
	00250 ;		
0009 1E01	00600 LOOKA	LD	E,1
000B 10	00700	DEC	E
000C 53	00800	LD	D,E
000E 05	00900	PUSH	DE
0010 CD0E7F	01000	CALL	INITS
0011 CD7E7F	01100	CALL	TEST
0014 3A0A68	01200	LD	A,(NA)
0017 07	01300	OR	A
0018 2B12	01400	JR	Z,LOOKB
001A FE02	01500	CP	2
001C 280A	01600	JR	Z,HELDR
001E 303E	01700	JR	NC,LOOKD
0020 3E01	01800	LD	A,1
0022 CD727F	01900	CALL	SAVE
0025 07	02000	OR	A
0026 1804	02100	JR	LOOKB
0028 D1	02200 HELDR	POP	DE
0029 1601	02300	LD	D,1
002B 05	02400	PUSH	DE
	02450 ;		
002C CD7E7F	02500 LOOKB	CALL	TEST
002F 3A0A68	02600	LD	A,(NA)
0032 07	02700	OR	A
0033 2B11	02800	JR	Z,LOOKC
0035 FE02	02900	CP	2
0037 2809	03000	JR	Z,HELDR
0039 3023	03100	JR	NC,LOOKD
003B 3E3E	03200	LD	A,2
003D CD727F	03300	CALL	SAVE
0040 1804	03400	JR	LOOKC
0042 D1	03500 HELDR	POP	DE
0043 1E01	03600	LD	E,1
0045 05	03700	PUSH	DE
	03750 ;		
0046 79	03800 LOOKC	LD	A,C
0047 FE06	03900	CP	6
0049 2B13	04000	JR	Z,LOOKD
004B FE03	04100	CP	3
004D 280F	04200	JR	Z,LOOKD
004F CD7E7F	04300	CALL	TEST
0052 3A0A68	04400	LD	A,(NA)
0055 FE01	04500	CP	1
0057 2905	04600	JR	NC,LOOKD
0059 3E03	04700	LD	A,3
005B CD727F	04800	CALL	SAVE
	04850 ;		
005E CD0E7F	04900 LOOKD	CALL	INITS
0061 D1	05000	POP	DE
0062 1E01	05100	LD	E,1
0064 1D	05200	DEC	E
0065 05	05300	PUSH	DE
0066 CD7E7F	05400	CALL	TEST
0069 CD7E7F	05500	CALL	ADD
006C CD7E7F	05600	CALL	TEST
006F CD7E7F	05700	CALL	SUB
0072 3A0A68	05800	LD	A,(NA)



0075 07	05900	OR	A
0076 2B11	06000	JR	Z,LOOKE
0078 FE02	06100	CP	2
007A 2809	06200	JR	Z,HELDR
007C 304A	06300	JR	NC,EDGE
007E 3E3E	06400	LD	A,2
0080 CD727F	06500	CALL	LOOKE
0083 1804	06600	JR	LOOKE
0085 D1	06700 HELDR	POP	DE
0086 1E01	06800	LD	E,1
0088 05	06900	PUSH	DE
	06950 ;		
0089 79	07000 LOOKE	LD	A,C
008A FE06	07100	CP	6
008C 2B12	07200	JR	Z,LOOKF
008E FE03	07300	CP	3
0090 280E	07400	JR	Z,LOOKF
0092 CD7E7F	07500	CALL	TEST
0095 3A0A68	07600	LD	A,(NA)
0098 07	07700	OR	A
0099 2905	07800	JR	NC,LOOKF
009B 3E03	07900	LD	A,3
009D CD727F	08000	CALL	SAVE
	08050 ;		
00A0 79	08100 LOOKF	LD	A,C
00A1 FE02	08200	CP	2
00A3 2B23	08300	JR	Z,EDGE
00A5 07	08400	OR	A
00A6 FE05	08500	JR	Z,EDGE
00A8 2B1E	08600	CALL	INITS
00AA CD0E7F	08700	CALL	TEST
00AD CD7E7F	08800	CALL	ADD
00B0 CD7E7F	08900	CALL	TEST
00B3 CD7E7F	09000	CALL	TEST
00B6 CD7E7F	09100	CALL	SUB
00B9 CD7E7F	09200	LD	A,(NA)
00BC 3A0A68	09300	CP	1
00BF FE01	09400	JR	NC,EDGE
00C1 2045	09500	LD	A,3
00C3 3E03	09600	CALL	SAVE
00C5 CD727F	09700		
	09750 ;		
0075C	CHECK FOR FINISH		
0075A	IF 50, SEVEN TIMES		
00756	INC. OF RECORDS GOES		
00760	INITS TB(0)		
	00762 ;		
00C8 D1	09800 EDGE	POP	DE
00C9 00	09900	DEC	C
00CA C28A7F	10000	JR	NC,JLOOKA
00CD D0E5	10100	PUSH	IX
00CF E1	10200	POP	HL
00D0 1108AA	10300	LD	E,TB
00D3 AF	10400	XOR	A
00D4 E052	10500	SEC	HL,DE
00D6 70	10600	LD	A,1
00D7 320A6A	10700	LD	(TB),A
00DA C9	10800	RET	
00DB	12300	END	
00000	TOTAL ERRORS		
33217	TEXT AREA BYTES LEFT		

## COMBAT SEQUENCE

Once all movement is complete, a check will be made for possible attacks. Different parts of the screen are flashed on the screen as the search is made. When a piece is found that has opponents within range, a letter will be placed to the right of each defender. There are two types of combat:

1. **ATTACKING AT ONE HEX RANGE**  
This is compulsory. If there is only one defender the attack takes place automatically. If there is more than one, the piece will flicker "WHO", to which you must reply with one of the letters appearing on the screen. The result of the attack will appear at the bottom of the screen. Tomahawks may only attack at one hex range.

2. **ATTACKING AT TWO OR THREE HEX RANGE**  
This is optional. If you do not wish to attack, press "ENTER"

**DEFENCE**  
A defender is permitted to return the fire once during the attack sequence. This is compulsory at one hex, but at two or more the piece will flicker "RTN". If you wish to return the fire, press "Y" or else press any other key. Having replied, there will be no defence in further attacks.

## ADD REGISTER

0000	00010	ORG	0
	00011 (X)(12) - ADD		
	00012 =====		
	00013 ADD 1 TO REGISTER C.		
	00014 IMOD 6		
	00015 ;		
	00016 ;		
0000 BC	00020	INC	C
0001 79	00030	LD	A,C
0002 FE07	00040	CP	7
0004 3002	00050	JR	C,SEVEN
0006 FE01	00060	LD	C,1
0008 C9	00070 SEVEN	RET	
0000	00080	END	
00000	TOTAL ERRORS		
34884	TEXT AREA BYTES LEFT		

## SUBTRACT

0000	00010	ORG	0
	00011 (X)(13) - SUB		
	00012 =====		
	00013 SUBTRACT 1 FROM C		
	00014 IMOD 6		
	00015 ;		
	00016 ;		
0000 00	00020	DEC	C
0001 3E01	00030	LD	A,1
0003 30	00040	DEC	C
0004 09	00050	CP	C
0005 2002	00060	JR	NC,ZERO
0007 0E06	00070	LD	C,6
0009 C9	00080 ZERO	RET	
0000	00120	END	
00000	TOTAL ERRORS		
34884	TEXT AREA BYTES LEFT		

**T**he movement routine is complete. Now we must approach the much more difficult part of the program which takes care of the combat. This occurs immediately the player has completed all moves. This article is devoted entirely to machine language routines. Next we will develop and complete the Basic portion so that you will see how they fit together.

The combat sequence involves examining up to 30 hex around each man looking for opponents. A diagram of this area is shown in figure 1. You will see that I have divided it up into 6 segments and labelled the hex in each A, B, C, D, E and F.

There are, of course, really 36 hex but because the hex is elongated due to the shape of the video pixel, one finds that a distance of three hex North or South is unrealistically far, so the top and bottom hex are ignored. If you want to have them, the adjustment is easy.

At this point, we must get into some heavy machine code. In order to make an attack, we need to know several facts about the opponent i.e.

1. His position on the screen. (2 bytes)
2. The position of boulders which provide cover. (2 bytes)
3. The distance between the two pieces.
4. The index of the defense.
5. The direction of the attack.

When we come out of the XS(16) routine we will have this information in a table called TB. The first byte in this will

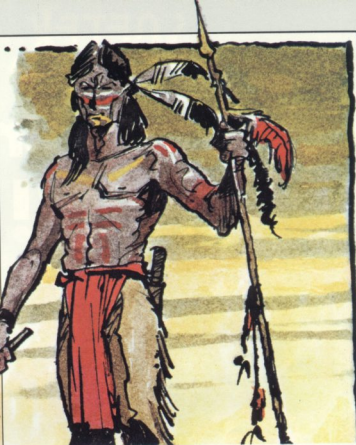


Illustration: John Davis

# WARPATH

*No wargame is complete without a good battle. In part six of his Warpath game, Ron Potkin tackles the combat routines as the cavalry and the braves move to adjacent hexes.*

contain the length which we divide by seven to obtain the number of defenders.

The code in XS(16) calls five sub-routines held in XS(10) through to XS(14). Some of these are very simple and I could have repeated the coding in the XS(16), but the length would have exceeded the maximum which can be held in one string.

Incidentally, this routine was first written and tested in Basic and then translated. For example:

```
XS(12)... C = C + 1
          IF C = 7 THEN C = 1
          RETURN
```

```
XS(13)... C = C - 1
          IF C = 0 THEN C = 6
          RETURN
```

I prefer this method. The idea is that I can get the logic correct in Basic so that, when writing the machine code, I need only concentrate on the syntax. It looks complicated because machine code re-

quires that you work at a much greater level of detail. Let me outline what happens:

1. Register BC counts the number of segments i.e. 6 (see lines 300-500 of RANGE). This is also the direction indicator. Assume that BC equals 1.
2. Register D contains 1 if we are checking a near boulder hex (A). Register E contains 1 if it is a far hex (B or D). These will be stored in the table if a boulder is found.
3. The routine TEST uses BC to obtain the offset. This gets us to A. It calculates the IBOARD and VIDEO positions as it proceeds. If there is a defender here, we need to look no further because the attack is compulsory.
4. Now we continue up to hex B and C using the same offset. Any defenders are saved in TB. We now go back to the start (using INIT). We call TEST which takes us to A and then increment C and call TEST again which takes us to D. Similar methods are used to reach E and F.

Just one point: the routines use the same names as the Basic program. This was necessary in order to stop my head going in circles! Do not confuse the two.

The six subroutines are in this month's listing. As usual, load the tape containing Parts 1 to 5 before you start. Sorry: there are several lines of numbers — so take it easy. Type in a few lines at a time and save at regular intervals. You will see that I have adjusted lines 4000 to 4020 which will check that the DATA is correct. Make sure that the XS strings are the following lengths:

XS(	10	11	12	13	14	16
Length	17	46	9	10	128	220

Once you have RUN this program, delete lines 791, 1085/6 and all lines from 2000 upwards. The only code remaining should be up to 1690 in multiples of 10. Now save this as well. You will be pleased to know that this completes all machine code — the remainder is now in Basic.

# SOFTEK

SOFTWARE

## Invading your space NOW!

### MONSTERS IN HELL

It was like a nightmare... trapped in a Hellish scene... chased through a maze of platforms and ladders by Vampire Monsters. But I had my Magic Hammer and The Power was on my side. The Monsters were falling at my feet! When suddenly the Mad Monk sent forth his ghoul.  
Amazingly amazing addictive game... in super-fast machine code, with full colour graphics and superb sound.  
Realisation: Martin Lewis.



### MEGAPEDE

No matter how fast I fired, the Megapede kept on coming! I was gaining ground, though, when suddenly the Spider appeared on collision course zero! Turn - dodge - I out-maneuvred, I blasted him. But just then Scorpi appeared dropping her indestructible fleas... 100% Nine levels of play plus high score, sensational machine code. Full colour and sensational sounds. Rated by T.V. Choice as "a superb rendering of the popular arcade game".  
Realisation: Andrew Beale.

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## CONTENTS AND UPDATE

```

0010      00010      ORG      0
0020      00020      XN(14) TEST
0030      00030      =====
0040      00040      FIND CONTENTS OF HEX DEFINED BY
0050      00050      IRL AND DIRECTION GIVEN BY REG. C
0060      00060      RETURNS MAX EDGE = 3, BOULDER = 2
0070      00070      DIPMENT = 1, OTHER = 0
0080      00080      ALSO UPDATES BL AND PR TO HEX POSITION
0090      00090      =====
0100      6000      00192      PR      EDU      275280
0110      6004      00193      BL      EDU      275240
0120      6008      00194      RM      EDU      275440
0130      600A      00195      NA      EDU      275380
0140      600E      00196      NK      EDU      275210
0150      7005      00197      BD      EDU      316690
0160      600E      00198      SK      EDU      275310
0170      600C      00199      VID      EDU      275320

```

```

00109 ;
00110 ;CALCULATE NEW PR FROM OFFSETS
00120 ;SEE RW IN BASIC - LINE990
00130 ;SIMILAR TO ROUTINE IN LINE 50

```

0000 218C6B	00150	LD	HL,VID
0003 7B	00160	DEC	HL
0004 2B	00170	DEC	HL
0005 07	00180	ADD	HL,BC
0006 09	00190	ADD	HL,BC
0007 5E	00200	LD	E,(HL)
0008 23	00210	JNC	HL
0009 56	00220	LD	D,(HL)
000A 2A886B	00230	LD	HL,(PR)
000D 19	00240	ADC	HL,DE
000E EB	00250	EX	DE,HL
000F EDC3886B	00260	LD	(PR),DE
0013 EB	00270	EX	DE,HL

```
00271 ;
00272 ;CALCULATE HEX
00273 ;SIMILAR TO ROUTINE IN X%(4)
00274 ;=====
```

0014 208460	0259	LD	HL, (BL)
0017 1681	0259	LD	D,1
0019 15	0300	DEC	D
001A 1E18	0310	LD	E,2,4D
001C 4F	0320	XOR	A
001D E052	0330	SUBT	SEC HL,DE
001F 3903	0340	JR	C,ROM
0021 3C	0350	INC	A
0022 1BF9	0360	JR	SUBT
0024 E401	0370	ROM	AND 1
0026 2196A6	0380	LD	HL,ROM
0027 2803	0390	JR	2,EVEN
002B 1E1C	0400	LD	E,12D
002D 19	0410	ADD	HL,DE
002E 49	0420	EVEN	ADD
002F 49	0430	ADD	HL,BC
0030 2B	0440	DEC	HL
0031 2B	0450	DEC	HL

0032 3E01	00460	LD	A,1
0034 30	00470	DEC	A
0035 328A6B	00480	LD	(NA),A

```

00402 ;-----
00404 ;UPDATE BL
00406 ;-----
0038 5E 00400 LD E,(HL)
0039 23 00500 INC H
003A 56 00510 LD D,(HL)
003B EB 00520 EX DE,HL
003C E050846B 00530 LD DE,(BL)
0040 19 00540 ADD HL,DE
0041 EB 00550 EX DE,HL
0042 E053846B 00560 LD (BL),D
0046 EB 00570 EX DE,HL

```

**POSITION OF ENEMY**

POSITION	ORG	0
0000	00010	
	00011	1X(11) - SAVE
	00015	
	00020	1A005 DETAILS ON POSITION
	00025	1F ENERGY TO TABLE
	00027	
	00030	
	00040	PR
6600	00050	NX
6601	00060	
0001 2A0046	00070	EDU
0003 0007401	00080	EDU
0006 0007582	00090	275280
0009 01	00100	275210
000A 01	00110	HL (PR)
000C D5	00120	LD
000E E5	00130	LD
	00140	LD
	00150	LD
	00160	LD
	00170	LD
	00180	LD
	00190	LD
	00200	LD
	00210	LD
	00220	LD
	00230	LD
	00240	LD
	00250	LD
	00260	LD
	00270	LD
	00280	LD
	00290	LD
	00300	LD
	00310	LD
	00320	LD
	00330	LD
	00340	LD
	00350	LD
	00360	LD
	00370	LD
	00380	LD
	00390	LD
	00400	LD
	00410	LD
	00420	LD
	00430	LD
	00440	LD
	00450	LD
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	00480	LD
	00490	LD
	00500	LD
	00510	LD
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	00670	LD
	00680	LD
	00690	LD
	00700	LD
	00710	LD
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	01080	LD
	01090	LD
	01100	LD
	01110	LD
	01120	LD
	01130	LD
	01140	LD
	01150	LD
	01160	LD
	01170	LD
	01180	LD
	01190	LD
	01200	LD
	01210	LD
	01220	LD
	01230	LD
	01240	LD
	01250	LD
	01260	LD
	01270	LD
	01280	

(X10+000).A					
0010 340148	00140	LD		A,(R0)	
0015 070705	00150	LD		(X1+050).A	
0020 070705		LD		(X1+030).D	
0014 007293	00160				
0010R NEAR ATT.		LD		(X1+040).E	
0019 007304	00170				
0010R NEAR DEF.				(X1+070).D	
0010C 007167	00100				
DISSECTION 1-6		INC		IX	
001F 0023	00190				
0000 7 TO INDEX		INC		IX	
0021 0023	00200	INC		IX	
0023 0023	00210	INC		IX	
0025 0023	00220	INC		IX	
0027 0023	00230	INC		IX	
0029 0023	00240	INC		IX	
002B 0023	00250	INC		IX	
002D C9	00260	RET			
0000	00290	HET			
00000 TOTAL ERRORS					
TEXT AREA BYTES LEFT					



```

0047 AF      00508      XOR      A
0048 11557B   00519      LD      DE,80
0049 19      00600      ADD     HL,DE
                00602 ;=====
                00604 ;GOT IT !
                00606 ;=====
004C 7E      00610      LD      A,(HL)
004D 32B16B   00620      LD      (000),A
004E FE63    00630      CP      99D
0052 2824    00640      JR      Z,EDGE
0054 FE3C    00650      CP      680
0056 2824    00660      JR      Z,BLOR
0058 FE33    00670      CP      510
005A 3818    00680      JR      NC,OTHER

```

```

00602:
00604: I;E HAVE A PLAN.
00606: FRIEND OR FOE?
00608:
005C 11FFFF 00609 LD DE,0FFFFH
005F FE1A 00700 CP 260
0061 3802 00710 JR C,LESS1
0063 1E01 00720 LD E,I
0065 3AB6 00730 JR LESS1 LD A,(SI)
0068 FE1A 00740 CP 260
006A 3802 00750 JR C,LESS2
006C 1601 00760 LD D,I
006E 7A 00770 LESS2 LD A,D
006F 6B 00780 CP E
0070 2805 00790 JR Z,OTHER

```

### TEMPORARY VARIABLES

[illegible]

```

0072 3E01 0000 LD A,1 ;F0E
0074 32AB6E 0001 PUTNA LD (NA),A
0077 C9 0020 OTHER RET
0078 3E03 0030 EDGE LD A,3
007A 1F8 0040 JR PUTNA
007C 3E12 0050 BLDR LD A,2
007E 1F4 0060 JR PUTNA
0080 0130 END
0000 TOTAL ERRORS
END 33191 TEXT AREA BYTES LEFT

```







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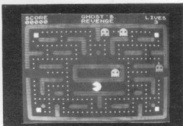


# 2K spectrum

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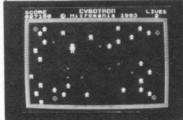
The best maze-chaser game available for the Spectrum \*Super-fast machine code action \*Excellent graphics \*Full use of colour \*Sound effects and tunes \*Normal or Invisible maze \*Skill level selector, novice to expert; this game cannot be beaten \*Usual features, gobble action, four ghosts, power pods that turn the ghosts blue, blue ghosts give 400, 800, 1200, 1600 bonus points. Top score, for Spectrum 16k or 48k. ONLY £5.95



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# GRAPHICS

By Garry Marshall

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A computer "sees" in exactly the same way that it does everything else —

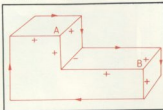


FIG 1: LABELLINGS

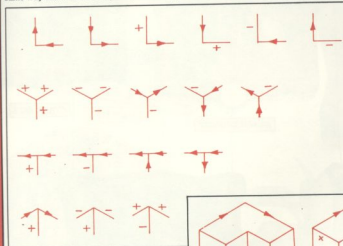


FIG 2: CORNER LABELLINGS

by running a program. In this case it must be presented in some way with an image of what it is seeing and run a program which can tell it what this image means.

The image can be presented by a video camera. However, it is a task beyond the current state of the art to interpret raw video pictures directly.

If such pictures are first processed to reduce them to line drawings, then it is a quite straightforward matter to interpret them.

In this article I'll explain how line drawings of three-dimensional objects can be interpreted so that a computer can be programmed to know what it is seeing. Next I will examine how ordinary pictures of an object can be reduced to line drawings.

In a line drawing of a three-dimensional object, each line can represent one of the following

- An edge projecting *outwards* at the join of two surfaces. Such lines are indicated by labelling them with a '+'. (B)
- An edge projecting *inwards* at the

The labelling can then be done by a program, and once the labelling is done, the shape of the object can be understood.

The key to doing the labelling automatically is in the way that the corners where edges meet can be labelled. The corners marked A and B in figure 1, for example, both show three converging edges all of which are labelled with '+', so that they are projecting outwards to form a corner of the kind possessed by a cube.

In fact, there are 18 permitted ways for labelled edges to converge at a corner. They are all illustrated in figure 2. All other possible corner labellings correspond to situations that are physically impossible.

With the aid of this list of valid corner labellings, we can give a method for the automatic labelling of a line drawing. It is:

1. Label the perimeter of the drawing with arrows forming a clockwise ring.
2. Complete the corners on the outside with corner labellings selected from figure 2.
3. Work inwards to label the remaining corners with valid labellings until the labelling is complete.

These three phases are illustrated in figure 3. Step 3 required two passes in

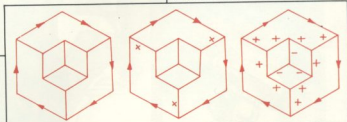


FIG 3: THE THREE PHASES

join of two surfaces. Such lines are indicated by representing them with a '-'.

(c) An edge at which one of the surfaces hides another. Such lines are labelled with an arrow. The direction of the arrow is such that when walking along the edge the surface which hides the other is always to the right.

These labellings are illustrated in figure 1. A brief examination of the diagram will show that the shape which you automatically assign to the object that is represented in the figure is confirmed by the labelling of the lines.

Having seen that the labelling corresponds with the way that we see an object, what is needed now is a procedure for automatically labelling any line drawing of a three-dimensional object.

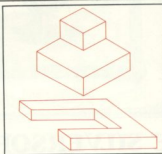
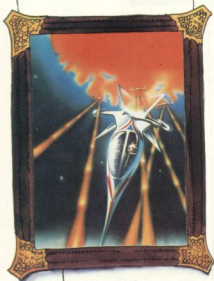


FIG 4: EXAMPLES

the figure illustrated.

You might care to try your hand at the examples in figure 4, and to test the results by comparing them with the way that you see the objects.

# EVERY ONE A



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# MACHINE CODE

We have not yet covered all the different types of machine code instruction, but we have looked at enough instructions to be able to write some useful routines.

Instead of looking at new instructions this month we will look at how to use the routines built in to the computer's ROM in conjunction with the instructions we already know.

## ROUTINES AND HARDWARE

All computers have built in routines to handle such basic operations as printing a character, reading the keyboard, tape input and output, etc.

The details of these routines depend on the hardware of the particular computer, and they are usually quite complicated.

For example, the routine to print a character on the screen has to produce the actual dot pattern for the character, keep track of the cursor position, provide automatic carriage return/line feed at the end of each line, provide automatic scrolling at the end of the screen, and also has to handle various non-printing control codes.

Before you can use these routines in your own programs you need to find their memory addresses and how to pass values between these ROM routines and your program.

The manual for the BBC micro gives details of how to use several ROM routines, but with most small computers you have to rely on what users have found out for themselves and published in magazines or books.

## PRINTING THE MESSAGES...

In the example programs printed here I will assume that to print a character on the screen you have to get the ASCII code for the character into the accumulator and call a subroutine called **OUTCH**, and I will also be assuming that **OUTCH** does not alter any of the registers. Most computers do have a routine that works like this.

Suppose we have a message stored in the computer's memory, and we want to print the message on the screen.

We need to know the address where the message starts, which we will call **MESSGE** (abbreviated because assemblers normally allow only six characters), and where the message ends.

There are several methods you can use to indicate the end of a message, for example, put zero after the last character, or add 128 to the code for the last character (this will not usually cause any confusion as the codes for the normal printing characters are less than 128).

The examples here mostly assume that you know the actual length of the message and the routines count the number of characters printed. The form of the routines is:

```
Initialise pointers
Repeat
  Read character
  Print character
  Advance pointer
Until end of message
```

We can now look at the routines in detail.

## LET'S GO FOR A LOOP!

6502

Routine (a) is quite simple: we use the X register as a pointer and load the character to be printed into the accumulator using absolute indexed addressing.

The character is printed by calling the ROM subroutine **OUTCH**, and we then increment the X register to point to the next character and compare the value in the X register with the length of the message.

If the value in the X register is not equal to the length of the message we loop back to process the next character.

Routine (a) can only be used when the message is less than 256 characters long, as the registers in the 6502 are only 8-bits long.

If the message is more than 256 characters we can use routine (b), which is more complicated as we have to handle 16-bit numbers in two 8-bit sections. The characters of the message are read into the accumulator using indirect indexed addressing (or post-indexing).

This requires the base address to be stored in two consecutive page zero locations, which are called **MESSAD** and **MESSAD+1** in the routine.

The first few lines in routine (b) calculate some constants which are used later. A standard 6502 assembler will allow calculations of this type, and will

also allow the calculations to be performed in operands.

The numbers involved in the arithmetic must be between 0 and 65535, and division always returns an integer result, any fractional part being discarded.

Thus, if **MESSGE** were \$1234, the first two lines of routine (b) would give **MESSHI** as \$12 and **MESSLO** as \$34, separating the address into its high and low bytes.

After the initial calculations routine (b) puts the low and high bytes of **MESSGE** into the page zero locations **MESSAD** and **MESSAD+1**, and sets the Y register to zero.

After a character has been printed the pointer is advanced by incrementing the contents of memory location **MESSAD** (the low byte) and if the low byte becomes zero the high byte also has to be incremented.

The test for the end of the message also has to be done in two parts. The high byte of the current address is compared with the high byte of the address of the end of the message (which was calculated at the beginning); if they are not equal the routine loops back to process the next character; if they are equal the low bytes have to be tested.

## DEFICIENCIES OF THE Z80 SET

Z80

Routine (c) uses the HL register pair as a pointer to the current character and the B register as a counter for the number of characters. Note that, as the compare instruction **CP** performs a comparison with the accumulator, the contents of the B register are copied into the accumulator in order to perform the comparison.

The B register is 8-bits long, so routine (c) can only be used if the message is less than 256 characters.

Routine (d) will handle messages with more than 256 characters. The BC register pair is initially loaded with the address of the end of the message and after a character has been printed and the HL pointer incremented the routine tests to see if the contents of HL are equal to the contents of BC.

The test is a little complicated because of deficiencies in the Z80 instruction set.

The Z80 has no 16-bit compare instruction. However, you will remember that a compare instruction works by performing a subtraction, and keeps the

BY TED BALL



## ROUTINE (a) — 6502

```

NEXTCH  LDX #0                ; Get character
        LDA MESSAGE,X         ; Print it
        JSR OUTCH             ; Advance pointer
        INX                   ; Test for end of message
        CPX #LENGTH
        BNE NEXTCH
    
```

## ROUTINE (b) — 6502

```

        MESSHI = MESSAGE/256
        MESSLO = MESSAGE - 256*MESSHI
        MEND = MESSAGE + LENGTH
        MENDHI = MEND/256
        MENDLO = MEND - 256*MENDHI
        LDA #MESSLO           ; Initialise Pointer
        STA MESSAD
        LDA #MESSHI
        STA MESSAD+1
        LDY #0
        NEXTCH  LDA (MESSAD,Y) ; Get character
        JSR OUTCH             ; Print it
        INC MESSAD            ; Advance pointer
        BNE TEST
        INC MESSAD + 1
        LDA #MENDHI           ; Test for end of message
        CMP MESSAD + 1
        BNE NEXTCH
        LDA #MENDLO
        CMP MESSAD
        BNE NEXTCH
    
```

flags but not the actual result of the subtraction. Thus, a 16-bit comparison can be performed with a subtraction.

The Z80 has 16-bit Subtract With Carry operations but no 16-bit Subtract, without carry.

Thus routine (d) uses the instruction AND A to clear the carry flag, and SBC HL,BC to compare the contents of HL and BC. If the contents of HL and BC are equal we have reached the end of the routine and jump to the end of the routine.

If we have not reached the end of the message we must remember that SBC HL,BC has altered to contents of HL, so we must restore the value of HL with the instruction ADD HL,BC before looping back for the next character.

## INDIRECT AND DIRECT...

6809

Routine (e) will print a message of any length, and uses auto-increment addressing, which allows us to read a character and advance the pointer in one instruction.

After printing a character the routine tests for the end of the message by comparing the contents of the X register with (MESSAGE+LENGTH), the address of the end of the message.

The auto-increment and auto-decrement instructions are very useful in handling messages and tables of all kinds.

The operand forms are R+, R++, -R, --R, R[R, R+], [R, --R] where R may be any one of the 16-bit registers X, Y, S, U. R+ takes the contents of the memory location pointed to by register R and then increments R; R++ takes the contents of the memory location pointed to by R and the next higher memory location, and increments R twice. -R and --R work similarly but register R is decremented before the memory reference takes place.

The indirect forms [R, R+] and [R, --R] use the memory location pointed to by the contents of the memory locations pointed to by R.

Indirect auto-increment and auto-decrement only increment or decrement twice because the indirection requires a two-byte operand.

CONTINUED NEXT MONTH

## ROUTINE (c) — Z80

```

        LD HL, MESSAGE
        LD B, 0
        NEXTCH  LD A, (HL)      ; Get character
        CALL OUTCH             ; Print it
        INC HL                 ; Advance pointer
        INC B
        LD A, B                ; Test for end of message
        CP LENGTH
        JR NZ, NEXTCH
    
```

## ROUTINE (d) — Z80

```

        LD HL, MESSAGE
        LD BC, MESSAGE+LENGTH
        NEXTCH  LD A, (HL)      ; Get character
        CALL OUTCH             ; Print it
        INC HL                 ; Advance pointer
        AND A                  ; Clear Carry Flag
        SBC HL, BC             ; Test for end of message
        JR Z, DONE
        ADD HL, BC
        JR NEXTCH
        DONE
    
```

## ROUTINE (e) — 6809

```

        LDX #MESSAGE
        LDA X+
        JSR OUTCH
        CMPX #(MESSAGE+LENGTH)
        BNE NEXTCH
    
```

Get char & advance pointer  
Print character  
Test for end of message

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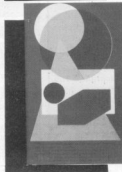
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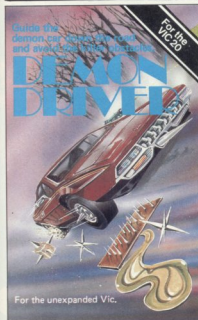
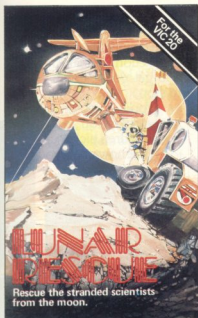
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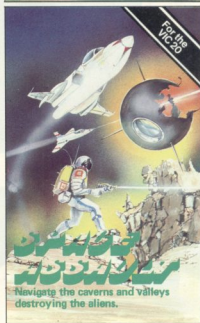
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This Cheshire-based company have become specialists in computerised war gaming with other titles in the range such as Peloponnesian War, Tyrant of Athens, Samurai Warrior, and Japanese Challenge.

Roman Empire is a strategy war game requiring thought and application.

Graphics are therefore not as crucial to the game as they are in other games. Even allowing for this the graphics in Roman Empire are very unimpressive.

All you get are columns of figures with a list of menu options around which the game is based.

A few more illustrations would have made the various columns of figures far more accessible. The odd map would have been very much appreciated as well.

The game has now been converted for the Dragon and Atari computers and some of the above suggested improvements have now been incorporated in these new versions. Why it is not possible to upgrade the Spectrum version is anyone's guess.

The idea of the game is to conquer the six countries that are hostile to you. In order to do this you must wipe out your enemies troops. You must build up your legions and launch campaigns in the regions you are attempting to annex.

A constant check has to be kept on your legions morale, fighting efficiency, energy level and status.

The only graphic display Roman Empire does give you is when you press the "next period" button — which totals your victories and defeats. What the display was supposed to be, however, I couldn't tell you. My girlfriend thought it looked like a screen full of ants. Any suggestions?

Confirmed war gamers may get something out of this one. For the uninitiated though — it would have to have greatly improved on-screen instructions and

graphics before I would reach for my wallet.

- Getting started 4
- Value 4
- Playability 4

## CLASSIC ALIENS BEGIN A BRAND NEW INVASION SPACE INVADERS

The latest release from Bug-Byte for the BBC micro is a version of that granddaddy of all video games — Space Invaders.

You would not normally expect a software house to launch a copy of this classic game when several other adequate versions already exist unless it was a particularly good version. This version does not fall into that category.

Bug-Byte has not made the most of the BBC's colour and sound potential.

The machine is easily capable of producing a truly de-luxe version of Space Invaders though this cassette is sadly unworthy of that description.

The mystery saucers did not appear at the correct times and lacked the sound and movement of the arcade original.

In the games favour: it was fast and the aliens exploded cleanly when hit.

Despite this I couldn't help thinking that for £7.50 I was entitled to something more than the same old format. For an extra couple of pounds practically any game from the Acornsoft range is better value for money.

- Getting started 9
- Value 4
- Playability 3





# SOFTWARE SOFTWARE SOFTWARE SOFT REVIEWS

## BEWARE THE DEADLY BUG-TRAIN!

### STAR MAZE

If you fancy trying your hand at blasting a weird assortment of aliens and getting lost in the graphics of a maze then *Star Maze* is the game for you.

The idea of the game is to pilot your space shuttle through an enormous scrolling space maze — mining the jewels that appear every so often and taking them back to your mother ship.

The screen is divided into two sections. The left two-thirds of the screen displays the maze and your ship and the remaining third displays all relevant game information — score, high score, amount of fuel left, number of bullets left, ships, and various types of aliens drowned.

Various aliens are attempting to thwart your mission in the shape of asteroids, cruisers, and toughest of all — bug trains.

There is only one effective way to deal with the bug trains and that is to use one of your three smart bombs on them. A single bullet will only cause the bug train to split letting out a Pandora's box of nasty aliens.

You are armed with a sophisticated laser capable of single fire and also rapid fire. This enables you to use your limited supply of ammunition most effectively. You begin the game with three smart bombs but can earn an extra one each time you clear one level.

There are sixteen levels in all though you will need to be a pretty skilled space ace to get that far. After weeks of play I'm still stuck on the sixth.

Ship control is the most difficult part of *Star Maze* and it took me quite some time to master the technique. You could really do with a third, or even fourth hand there are that many controls to keep a spare finger on.

You have short and long distance thrust, rotate left and right, single fire, rapid fire, hyperspace, smart bomb, and even a freeze button which enables you to pause the game to answer the phone or plan your strategy for an imminent alien onslaught. Sound and graphics are not outstanding.

I was hooked on *Star Maze* from the very first game. Once I'd mastered the controls the game became more and more fascinating and I can confidently recommend it as one of the best games now on sale for the Apple.

Manufactured by Sirtech for TSR the game is sold by SBD of London at £21.00.

- |                   |    |
|-------------------|----|
| ● Getting started | 8  |
| ● Value           | 9  |
| ● Playability     | 10 |



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### POWERBOAT RACE

Futura Software's *Powerboat Race* gives you the chance to pit your wits against the world's top powerboat racers on the BBC model B.

The program loaded first time and presented a detailed title page with full playing instructions. You are invited to enter the *World Powerboat Championships*. You can also choose the one or two player game and name your drivers before the computer chooses your opponent.

You'll need joysticks and 32k to play the game and I found it difficult to control the boat at first — although this was due more to the joystick than the program.

Making life more difficult on the high seas as you race along are two bobbing yellow buoys which must be negotiated to clock up those all important laps.

Each race consists of three heats of 15 laps and points are scored according to your position at the end of the race; 400 for first place, 300 for second and 200 for third. The driver scoring the most points over the three heats wins.

Screen presentation was quite good with your score and number of laps completed displayed at the bottom of the screen during each race.

The game was more frustrating than addictive because of the poor control afforded by the joysticks.

- |                   |   |
|-------------------|---|
| ● Getting started | 7 |
| ● Value           | 6 |
| ● Playability     | 5 |

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## FUN FILLED LITTLE BOXES

Remember the pure joy of scribbling? Before you were old enough to be expected to produce forms representing vases or bowls of fruit? When you were allowed to spread colour over an endless supply of pure white paper in the nursery school?

Some of that infantile anarchy is left loose in Atari's latest arcade conversion for the 400/800 home computers. The game is called **Qix** and will already be well known to arcade-goers.

For those of you with strict parents who turn purple when you mention your local arcade the game is simple to learn but difficult to master.

You control a marker which you must move around the screen drawing boxes. When a box is complete the computer will colour it in either red or blue — depending on the speed at which the box was drawn.

A red box is worth more points and is drawn more slowly therefore putting you at greater risk from the Qix.

This is a shape with four prongs — like the head of a fork — which bounces around the screen at random. If it careers into your marker when a box is incomplete you loose a life.

When you have boxed in 75% of the

### QIX

screen the Qix has insufficient room to manoeuvre and you then move on to a fresh screen.

Two other nasties who track you more systematically than the Qix are the Spax. You start off with just two of these but their numbers multiply each time the red marker line at the top of the screen shrinks to zero.

Watch out for these electronic adversaries running up the lines of your boxes.

Also out to get you is the Fuse which will ignite if you stop drawing without having completed a box.

Just to make things even tougher the Qix increase in numbers as you move up through the screens.

Qix is for one or two players, retains a high score, and is in your local Atari stockists now at £29.99.

For pure originality this game shines out amongst a universe of aliens. It will not grab you from the first play — it takes time to appreciate its subtleties — but it is one very good game.

- Getting started 9
- Value 4
- Playability 8

## NOT THE GAME OF THE FUTURE

Blind Alley is a snake chase type game where you have to avoid your own tail and attempt to make two pursuing snakes crash into it.

Despite this, the cassette inlay depicts a space scene and gives some blurb about Blind Alley being the sport of the future. New software house — Sunshine — are not alone in producing misleading cassette inlays. Some of the worst offenders are the established software houses.

The idea of the game is to hem in the snakes before they can do the same to you. You score a hundred points for each snake successfully crashed.

You begin with two fairly slow snakes and then progress to two quicker ones, then four snakes and so on. Trouble is its all rather slow. The snakes are difficult to control with the keyboard and, if you accidentally press the wrong key they have the annoying habit of disappearing.

### BLIND ALLEY

The graphics were not the most colourful I have seen on the Spectrum to say the least. I also felt that the game would have been much better if you had something, or things, to gobble up as you guided your snake around the screen.

It is not possible in Blind Alley to rectify a mistaken move by steering yourself out of trouble — instead you must start all over again from the beginning.

About the only good feature of Blind Alley was the high score board which enabled you to write your name in full, congratulated you on a high score, and kept a "Hall of Fame."

Blind Alley is available from Sunshine Software at £4.95 and runs on the Sinclair Spectrum in 16 or 48K.

- Getting Started 8
- Value 3
- Playability 3

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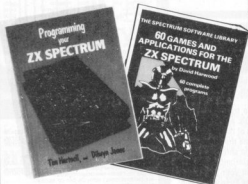
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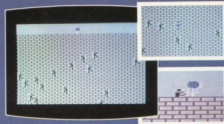
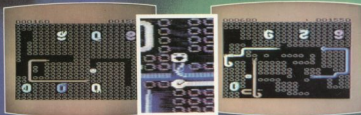
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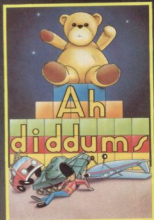
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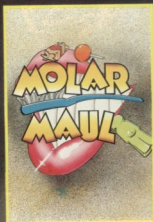
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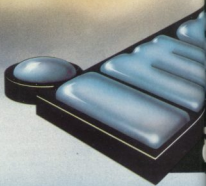
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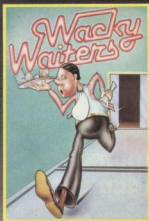


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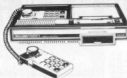
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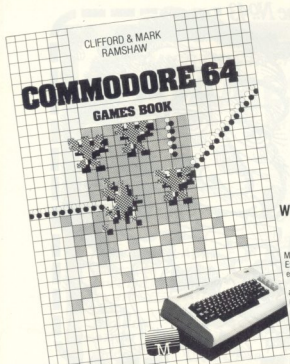
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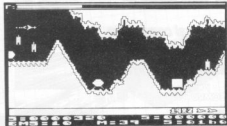
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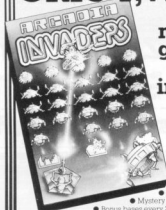
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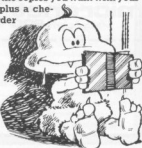


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(VIC-20)

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Hunt the alien moving around your sector at the speed of light. Destroy the alien's drones as he lays them in your path, whilst avoiding rogue asteroids. Watch out! Your fuel is diminishing and the pace is accelerating. Your chances of survival are slim.

- ★ High speed machine code action
- ★ Unexpanded VIC
- ★ Joystick control
- ★ 10 levels of play
- ★ High score display
- ★ Fuel replenishment
- ★ Fire action in any direction

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